CHEMICAL MARKETS

THE BUSINESS MAGAZINE OF CHEMICAL INDUSTRIES

VOLUME XXXII FEBRUARY, 1933 NUMBER 2

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CHEMICAL MARKETS is published monthly by Chemical Markets, Inc. WILLIAMS HAYNES, *President;* H. H. ADAMS, *Vice-President;* WILLIAM F. GEORGE, *Secretary-Treasurer.*

Published on the tenth day of each month at Pittsfield, Mass., and printed for the publishers by the Sun Printing Company

Entered as second class matter, January 1, 1928 at the Post Office at Pittsfield, Mass., under the act of March 3, 1879.

SUBSCRIPTION RATES are: domestic, two dollars, in advance, Canadian and Foreign, three dollars a year; single copies of the current issue are twenty-five cents each, back issues fifty cents each. Notice of three weeks is necessary in order to change subscriber's address, and in notifying, kindly give both the old and the new addresses

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EDITORIAL AND ADVERTISING OFFICES, 25 SPRUCE ST., NEW YORK, N. Y.; PUBLICATION OFFICE, PITTSFIELD, MASS.

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VOLUME XXXII NUMBER 2

Chemocracy

SINCE 1909 the rate of increase in power consumption has been declining, till in the past ten years it has been less than 20 per cent. for all American industries. For the chemical industry, however, the power consumption has grown, during the same period, over 65 per cent. The value of all American manufactures has roughly doubled since pre-war. The value of our chemicals has more than tripled. Our chemical industries are making a better-than-average growth, and as chemicals are chiefly industrial raw materials, we find in the statistics confirmation of the replacement of chemical for natural raw materials and the displacement of mechanical by chemical processes.

This is the essence of the Chemical Revolution. Logically this movement will continue, and on the basis of known facts we can foresee results that will seriously alter our present industrial conditions.

Chemical industry is distinctive in that it provides a double opportunity for progress---new products and better processes. Accordingly, it suffers from an extra high ratio of obsolescence and this, with the high rate of plant deterioration, means excessive replacements.

Another distinctive economic characteristic of chemicals is that they are great cost savers. Synthetic raw materials win their way to commercial use first by being cheaper than their natural rivals, and second, by differing from them in that the greater the consumption, the lower the price.

As our industries become increasingly chemicalized and as we use more chemical (as distinguished from natural) raw materials, we may expect these particular chemical characteristics to predominate all our industrial activities with some notable results. For example, the tempo of progress under a chemical regime of industry promises to be even swifter than during the past century of astounding mechanical development. New products mean new industries, and the ratios of technological unemployment may well be radically changed. High obsolescence, and great depreciation mean not only a swift turnover of invested capital, but also a large employment of labor in construction and maintenance. Cheaper goods is a quick, practical way of raising real wages. Economic forces of dynamic possibilities are locked up in this chemical progress. They will revise some old theories of supply and demand, distribution, hours, and competition.

RESEARCH AND RECOVERY

TODAY American Industry turns to Chemical Research as a vital aid toward recovery.

Advances in product improvement —often coupled with lower costs, are affording many manufacturers distinct advantages in their field.

Swann Research is constantly contributing to the success of a large cross section of industry by finding a better way — a new ingredient, a purer, more adaptable material or new methods that reduce cost.

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A new year is ahead of us. Resolve now to find out how Swann Research and Swann Materials can help you make 1933 the Recovery Year.

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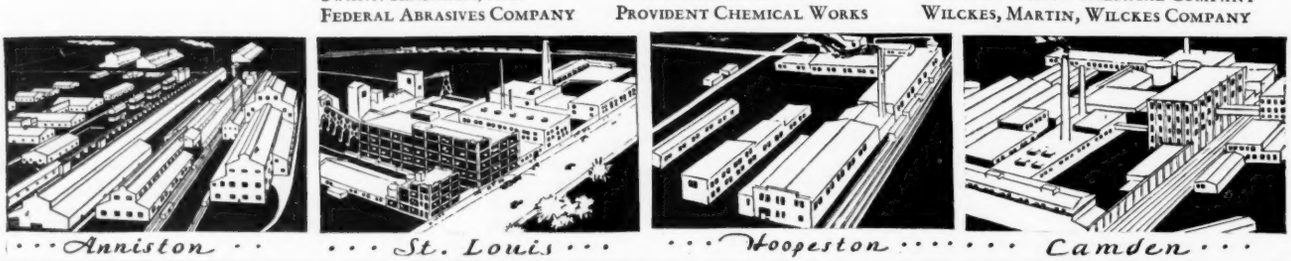


Plastic Products Most chemical men believe that no group of chemical products promises so much for the future as do those comparatively new synthetic materials, the plastics. Great advances have been made in this field and there are now available a variety of synthetic resins and cellulose derivatives that furnish a wide range of special chemical and physical characteristics capable of manifold uses. Each week sees some new and particular application of these materials to a new use, and admittedly only a beginning has been made in developing the plastics materials.

We share this enthusiasm over the prospects for these interesting chemical materials, and we are glad to announce an alliance with R. C. Gilmore, Sr. and Jr., whereby their magazines "Plastics" and "Cellulose" will be combined in a new monthly to be called "Plastic Products" in which their special knowledge of this field and their wide acquaintance in these industries will be combined with our publishing resources and experience to build a new, a broader, and a more valuable business magazine designed specifically to serve the consumer who uses plastics as an industrial raw material. "Plastic Products" has a future quite as brilliant as the plastics industries, and we plan to have the magazine do its full part in furthering the development and widening the markets for what certainly promises to become one of the most important branches of chemical industry.

American Valuation Washington is more concerned with depreciated currency and American valuation than with balancing the budget, debt settlements, or the new cabinet rumors. The Tariff Commission has held hearings, the Senate has debated and, the House Ways and Means Committee has busied itself with the same problem. For countries off the gold standard have in effect nullified the intent of the 1930 tariff act, and American manufacturers have informed leaders of Congress in no uncertain terms of their plight, hence the feverish excitement in the last weeks of the short session. Influential labor leaders have added their voices to the demand for relief.

In so far as the emergency is affecting chemical industry, a wide variety of materials have been and are still being offered at prices low enough to force down the domestic market almost to a state of demoralization. Even though actual tonnages imported have in some instances been small, the same weakened price structure has resulted.

Overwhelming sentiment is in favor of doing something and doing it quickly. Unfortunately, unity of thought stops at this point. As the secretary of a well-known chemical trade association recently said, "Almost everyone is agreed in principle, but each little group has its own pet scheme to remedy conditions and in all probability nothing will be done, or if it is, it will be done too late."

Two groups are endeavoring to obtain the same result by two different methods. One would change the basis of ad valorem duties to an American valuation and would broaden by suitable legislation the powers of the Tariff Commission to enable that body to deal with the depreciated currency problem. This plan is supported at least in part by these considered as spokesmen for the President, by Treasury officials, and by the Chairman of the Tariff Commission. The other group insists that Congress should pass at once a measure (Crowther or Hill bills) that would compensate for the currency declines in exporting countries. It seems quite unlikely that the division of feeling can be adjusted so that unanimity of action can be obtained in a reasonable length of time, particularly after the testimony of Robert J. O'Brien, Republican Chairman of the Tariff Commission. "Those who vote for the Crowther bill might as well and should vote to take the United States off the gold standard." In another part of his testimony he stated that, "we are not being flooded by imports."

The Chairman of the Tariff Commission has missed one vital point. It is not the quantity of imports alone that should be considered. Of still greater importance is the price and the fact that at the present moment, goods are being offered at levels that are demoralizing the domestic price structure. Further, a comparison of total export or import figures means little; it is the fate of individual items that matters in this critical situation.

It is too bad that in such an emergency there should be such a division of thought among those who profess to aid. After all, it little matters whether the desired end is achieved by congressional legislation or through a strengthened Tariff Commission, just so long as American markets are preserved for domestic producers. The latter way seems simplest and safest, but the big fact is that today we have little chance in most export markets under present conditions. Let us then reserve domestic markets for American-made materials. After all, this is just what every country in the world is strenuously striving to do.

Budget Ballyhoo It does not seem very likely that the budget deficit for 1933 will be very much less than two billion dollars. This is a guess based upon what can now be pieced together of Mr. Roosevelt's plans for "the new deal." These will include the following expenses — reforestation and Muscle Shoals operation, the direct relief plan, the parity farm plan (or a substitute), the mortgage relief plan, a fund to liquidate closed banks. On the credit side of the national ledger is promised cuts in federal expenses and a consolidated funding of the floating debt. Against these there will surely be a decline in revenues to be made up by more taxes and concessions on the war debts.

It is pretty plain, therefore, that the Government is going to come into the market as a large borrower, and this is the basis for the belief that some sort of carefully controlled inflation will be attempted, for no Government can go on at such a pace of expenditure without seriously affecting the value of its own currency.

Chilean Dynamite Competent engineers agree, that, if all taxes, bond interest, depreciation on plant and depletion of reserves are thrown overboard, Chilean nitrate may be landed at our Southern Atlantic ports for $14 a ton, and possibly for a little less. This is estimated to be higher than the cost of synthesizing ammonia, but lower than the cost of nitrogen fixation plus the charges for conversion into manufactured nitrate. Stripped to the skin, this is the domestic competitive nitrate situation at the moment; but as always there are other considerations than naked costs and bare freight charges.

First, what is to become of some 3,000,000 tons of Chilean nitrate now delivered and in warehouse at ports of entry in Europe and America, and upon which the Anglo-Chile Bank of London has advanced funds at the rate of some $27 a ton? Of these stocks about 400,000 tons are held in the United States, more than counterbalancing the 300,000 tons of synthetic nitrate currently reported on hand here.

Second, by dissolving the Cosach, Chile tacitly assumes responsibility for the nitrate situation and this seriously involves not only national finances, but also the bread and butter of a large number of her citizens. At best, it is an uncomfortable position for any shaky government. At worst, it becomes a desperate situation. Pressure, and pretty plainly terrific pressure, both internal and external is bound to be applied to the nitrate situation. The Chilean Government will probably have no alternative other than to cancel the interest payments on all nitrate debts, both public and corporate, forego their nitrate taxes and ship nitrate into the world markets at prices which will sell these goods in whatever market is not barred to them by embargo or tariff.

It is the old story of desperate competition, but there are some curious variations in the theme, for according to perfectly good South American practice, it is inconceivable that any more or less revolutionary unstable government can strip from their selling cost the perquisites which always slip into private pockets. Whether these will establish the rock bottom price substantially above the naked costs remains to be seen, but there is no doubt that the European countries are more aware of the dangers of this situation to their own nitrate industries, and are fully prepared to protect them, so that there is good prospect that the United States is very shortly to become the only major outlet for this very much distressed Chilean material.

Quotation Marks

You cannot build a reputation on the things you are going to do.—*Atlantic Coast Line News.*

Industries are prohibited by law from agreeing to limit production, and from agreeing on prices. Any move in the direction of cooperation along those lines brings prosecution for violation of anti-trust laws. Consolidations that might prove helpful are in some instances under legal prohibition.—*The Houston Post.*

The prime function of a trade publication is to give accurate information—information with intelligent interpretation—of the markets; information relating to the technical aspects of the industries served; information that will enable one enterprise to profit by the practices of others.—*Cotton and Cotton Oil News.*

Fifteen Years Ago

(From our issues February 1918)

The Chemical Alliance, Inc. holds first Annual Convention in New York. Largest gathering of its kind ever held in U. S.

According to reports, Du Pont Chemical Works will be ready to make deliveries of synthetic indigo by 15th of month.

Atlas Powder Co. acting for Government begins construction of $6,000,000 nitrate of ammonia plant near Perryville, Md.

"The labor situation in this country is extremely critical," said Herman A. Metz, at a recent meeting of the Brooklyn Civic Club.

Monsanto Chemical Works, St. Louis, incorporates in Illinois with capital stock of $70,000, of which $28,000 will be devoted to manufacturing chemicals and dyestuffs at East St. Louis, Ill.

Rare Gases Become Common Chemicals

By F. P. Gross
Air Reduction Company

LET us consider for a moment the percentage of these gases as contained in air. To bring out more clearly just exactly what the small volume of these Rare Gases means, Ramsey pointed out that there is less xenon in a unit volume of air than there is gold dissolved in that unit volume of seawater. Expressed in another way, a popular writer in the *Saturday Evening Post* some years ago calculated the length of time it would take a man, breathing normally, to inhale a volume of xenon equal to the volume of one breath of air. This worked out to be 2,100 years!

Table 1—Analysis of Air

Nitrogen	78.03%	Helium	0.0004%
Oxygen	20.99	Krypton	0.0001
Argon	0.94	Xenon	0.000009
Neon	0.00123	Carbide Dioxide	0.034
	Hydrogen	0.012 (?)	

While we are on this point, Claude mentions in the last edition of his book on the separation of elements of the air the fact that many people ask why helium (much more common than xenon) is not produced from the atmosphere for balloon use. He comments briefly as follows ". . . . it is possible to obtain with 100 cubic meter oxygen apparatus 833 cubic feet of helium per year. On that basis, the inflation of a Zeppelin would require 2,000 years—not a day more. We are working with small quantities after all even though in handling them every day, as we are, we hardly consider them any more as rare gases. While the theoretical consideration of the separation of air into its constituents is well known, we shall consider it briefly at this point:

Table 2—Boiling Points

Nitrogen	—195.814° C	Neon	—246.31° C
Oxygen	—182.963	Helium	—268.98
Argon	—185.84	Krypton	—152.9
	Xenon	—107.1	

From the boiling points we can decide just what partial separation of these gases can be secured from the fractional distillation of liquid air. Nitrogen, neon, and helium having lower boiling points will distill over first, leaving oxygen, argon, krypton and xenon in the residual liquid. A second fractionation of this argon-oxygen mixture provides the partial separation to give us oxygen and raw argon. The completeness of this fractionation is sufficient to provide oxygen better than 99.5 per cent. pure and a raw argon approximately 50 per cent. pure which is further purified chemically by removal of the oxygen by means of hydrogen. Krypton and xenon are collected in the residual liquid and purified and separated by physical means in the laboratory. Nitrogen, like oxygen, may be produced better than 99.5 per cent. pure at the column but the neon-helium mixture must, of course, be treated further to remove the nitrogen impurity and then the two gases are separated from each other.

The following properties are characteristic of the rare gases of these elements:

1. They are chemically inert.
2. They show characteristic spectra which, nevertheless, show general resemblances.
3. The gases show general resemblances and gradations in physical properties such as are seen in other families or groups of elements.

All these gases are colorless, odorless and tasteless and in every case the ratio of the specific heats approximates closely the theoretical value (1.667) for a monatomic gas. A uniform gradation of properties is clearly seen in the values of the density and molecular weight, the thermal conductivity, the refractive index and dispersion, the critical temperature, the boiling-point and melting-point, the density of the liquid, and the vapor-pressure ratio. With reference to the compressibility, the solubility in water, the viscosity, and the specific inductive capacity, it will be observed that there is a similar gradation of properties, the uniformity of which is, however, broken in the case of neon.

These rare gases are exceedingly sensitive to electrical discharges and in the rarefied condition, pure and dry, glow with characteristic light when sub-

jected to the passage of a high tension electric current. The spectra are characterized by lines in that portion of the region giving the characteristic color of each gas and are materially altered by inclusion of a Leyden jar and spark gap, the strongest of the ordinary lines being only just visible while many new lines appear in the more refrangible region.

Table 3—Color of Rare Gases Subjected to Action of Electric Current

Neon	Red
Argon	Purple
Helium	Pinkish White
Krypton	Pale Violet
Xenon	Sky Blue (uncondensed discharge)
	Green (condensed spectra)

The principal use for argon still continues to be in the incandescent lamp industry. The emission of light from heated tungsten wire increases as the temperature of the wire is raised. In a vacuum a tungsten filament will tend to vaporize more readily than in a gaseous atmosphere under pressure. If tungsten can be maintained at atmospheric pressure at a temperature just below its volatilization point, more light is emitted than is possible with the same wire in a vacuum. Since tungsten combines readily with most gases, this pressure can be maintained only by an inert gas. Argon is more suitable for this use because unlike nitrogen (the gas formerly used) it is absolutely inert under all conditions regardless of temperature. Hence, because in time nitrogen would tend to combine with the tungsten filament under the conditions at hand, we find that commercial incandescent light bulbs are filled with a mixture of 86 parts argon and 14 parts nitrogen. (Some nitrogen is present to prevent arcing.)

In a manner similar to its use in incandescent lamps, argon is used in certain of the newer types of bulbs or tubes for production of ultra-violet. Its action here again is passive in that the ultra-violet is produced from the mercury arc and the argon itself simply serves as an inert medium with satisfactory electrical characteristics.

Argon is used to some extent in the tubular display sign industry, but this is taken up under neon which is the gas principally used in that field.

As an inert gas, argon probably will find future use. In fact, it is just for such a purpose it is now used in incandescent lamp bulbs, but we may expect to find argon applied in other cases where the conditions are such that nitrogen would not be inert and argon would be suitable. In any event, whatever these applications may be, the chances are that they will be highly specialized since the products will have to be such that they will stand and justify the cost of an inert gas of this sort.

The principal use for neon is in the tubular display sign industry.

Electrically, neon (and the other rare gases as well) is most unusual. It is exceedingly sensitive to electrical discharge; at pressures in the neighborhood of five mm. absolute it possesses remarkable properties, being ionized by charges of electrical energy of high potential but low energy content. Shaking a tube containing a bit of mercury sealed in with pure neon will cause the neon to glow.

The gas has an electrical conductivity 75 times as great in air. When in a rarefied condition, pure and dry, the passage of a high tension electric current causes it to glow with a very beautiful and distinctive orange-red light. The commercial sign tube is simply a glass tube equipped with suitable electrodes which has been evacuated and filled with pure neon at a pressure in the neighborhood of 10 to 15 millimeters absolute. The current used is ordinarily 15,000 volts, 60 cycle A. C., with a current flow of 25 milliamperes. This tube is the ordinary red display sign tube. To make a blue tube it can be done simply by adding a few drops of mercury to an ordinary neon tube. However, this does not work out so well in cold weather for outdoor use since the mercury will tend to condense and the blue color will fade. To offset this, mixtures of neon and argon with mercury are ordinarily used. For extremely cold climates a tube that will run even hotter is required and in these cases we simply add a little helium to increase the resistance. The disadvantage of adding helium lies in the fact that as the resistance increases the length of tubing that can be operated from a given transformer is cut down. In other words, we are getting more heat and less light for our input of electrical energy.

Obtaining Other Colors

Briefly, the green tubes are the same as blue with the exception that in place of clear glass, amber or uranium glass is used. The light rays other than green are filtered out and in that way we get the so-called green tube, the exact shade of which depends on the color of the glass tubing and the background.

While we are on this general subject of sign tubes, we may as well include the remaining colors, namely, white and yellow. White is ordinarily made up with helium at very low pressures in clear glass. For the yellow or gold we change the color of the glass tubing to an amber just as we did to make a green tube. In other words, the only difference between the green and blue is in the color of the tubing and likewise the only difference between the white and the yellow is in the tubing. A trace of some of the other rare gases is sometimes introduced into a helium tube with the idea of securing a somewhat lower voltage drop but in the main the helium tube has not yet been improved on. A really satisfactory white with proper operating and electrical characteristics is much to be desired. Announcement of a new low-voltage white light has just come in from the Pacific Coast. Various small diameter tubes of different colors are combined to produce a synthetic white. This is adapted for fixtures in stores and show cases illumination, color matching, et cetera.

Due to the low pressures used in this work, not much gas is required even though our advertising signs are literally plastered with neon and other gas tubes. One cubic foot of neon will fill about four miles of average sign tubing. In fact, the gas cost is the smallest part of the total cost of a neon sign.

On this question of rare gases for vacuum tube work, purity is essential. The presence of any gas in neon other than helium ruins its light-giving qualities. This means, then, that not only do we have to make these gases pure, but the users have to take steps to maintain that purity. All active gases, such as nitrogen, oxygen, carbon dioxide, water, vapor, must be kept out.

On the other hand, the addition of small amounts of other rare gases will many times change the electrical characteristics of a given rare gas. It is a common thing to make up a mixture of one gas containing, for example, 0.04 per cent. or 0.1 per cent. or some other per cent. of that order. This rare gas work calls for laboratory attention of the highest order. The main point to remember here is that anything that is done with these rare gases must be by physical means rather than chemical due to the fact that they are inert. In other words, they do not react chemically with anything else. Consequently, it is necessary to use adsorption processes for the most part.

The high visibility of the neon light has suggested its use for other purposes—for example, as a traffic signal and airplane beacon. It is reported that a neon light has the property of fog piercing but this seems to be a moot question, a recent Government Bulletin indicating that this is not exactly the case. However, the eye is apparently quite sensitive to an orange red light such as a neon tube gives forth, and the red neon glow does seem to have a marked effect on the eye nerves when it is viewed directly.

Along this line we may expect, eventually, the use of neon to become more widespread but probably on the basis of inherent advantages over incandescent lamps just as the neon tube has largely replaced the incandescent lamp for display sign use rather than because of controversial claims of better penetration of the light.

On this point, the following comparison between a neon roof sign with an equivalent incandescent lamp sign is of interest: while the total cost of the neon sign was about $2,500 and the incandescent lamp job was figured at $2,100, the current cost per hour for the former is 14 cents whereas for the latter it would be 90 cents.

We may expect, in general, the use of neon discharge tubes for illumination to increase, since it is not possible to get as good efficiencies with the filament type of bulb due to the heat developed along with the light.

Recently a sodium vapor lamp has been produced in Holland whose efficiency for street lighting is reported to be very high. This is of interest to us since the gaseous filling of these lamps is neon. There are a number of smaller neon tube devices rather widely used. One of the first automobile stoplights was a neon tube outlining a hand. Some time ago the neon tube was produced for use as a trouble finder in automobile engine testing, the tubes glowing brightly on a properly functioning spark plug and remaining dark on a foul plug. In like manner, neon has come into use as the current carrying agent in safety devices designed to protect electrical instruments and buildings from high voltages such as lightning. These devices because of the peculiarities

New York's Great White Way all dressed up with its nightly display of light. Neon signs are very much in evidence.

of neon, will allow hardly any current to pass below what is known as their break-down voltages. In fact, below this point the current flowing through the gas is almost infinitesimal. When once the break-down voltage is reached, however, and it may be somewhat under 200 volts, depending on the design of the device, current begins to flow. As soon as this occurs, the neon is ionized; its resistance greatly decreases with a corresponding increase in carrying capacity. As the result of the lowered resistance, very high currents can be conducted by a trace of the neon while in the case of other gases, only moderate currents can pass. Unless subjected for a long period to the action of the current, these devices are able to function many times, a small tube a half inch in diameter with gas at very low pressure, conducting as much as several hundred amperes.

Exhaustive tests in the laboratory have invariably tended to demonstrate that the accuracy and dependability of the neon type of lightning arrester is very much greater than that of any other arrester now known. The demand for these tubes now runs into many thousand per year.

Another use of neon is in the high voltage indicator which consists of a highly sensitive neon discharge tube equipped with special electrodes and assembled in a glass housing equipped with brass ferrules. Its characteristics are such that it will glow when subjected to comparatively low voltages with the passage of an infinitesimally small current. These act as indicators on high tension cables to determine whether or not there is current in the line and find application in power and transformer stations of the various lighting and electrical power companies. This application is of interest to insurance companies because of the safety-first feature. The device indicates, in other words, whether an electric power transmission line is "live" or "dead."

Manufacture of Neon Lights

The neon filled glow lamp is now on the market and a brief description of such a lamp is timely. The glow lamp consists of a bulb filled with a mixture of rare gases with two magnesium electrodes inside the bulb and a high resistance inside the base. We are indebted to an article which appeared in the *General Electric Review* for a further description of these lamps. "When alternating current of 100 volts or above is applied to the lamp, the gas is ionized, becomes conducting, and is thrown into luminous vibration around the negative electrode. The gas immediately surrounding the electrode glows with a soft pinkish glow, or corona. On alternating current first one electrode and then the other is negative alternately, and each in turn glows. At 60 cycles the alternations are so rapid as to cause both electrodes to appear to be continuously lighted. On direct current only one electrode glows. When operating on direct current about 40 per cent. higher voltage is required.

"The actual candle power of these lamps is very low, about 1/500 c.p., but the color of the light is such that it falls in that portion of the spectrum to which the eye is quite sensitive. The lamp, therefore, makes an excellent indicator, but should not be considered as an illuminant." The glow lamp is also built in the form of letters or crosses for display, house numbers may be made up and similar uses developed.

One of the developments of the present day is the photoelectric cell. This cell is peculiar in that it will carry an electric current only when subjected to light. Its current carrying capacity is also a function of the amount of light which falls upon it. This, of course, is just what is needed for the wireless transmission of photographs as it can easily be seen that such a device can be used to transmit pictures. In use, a light passing through a certain portion of a film is allowed to fall on this cell producing a strength of current which can then be used to produce the same effect at the receiving end on the same portion of a film through a perfectly synchronized reproducing apparatus. Many of these cells are filled with rare gases or mixtures of them. The use of a neon tube as the source of light for activating photo cells is of some importance. While the characteristics of the light itself are sadly lacking in actinic rays, the almost instantaneous time factor is of great advantage. There is practically no lag in flashing a neon tube.

Commercial Use of Helium

Commercially, atmospheric helium has little application. We have mentioned its use in display sign tube work for special purposes mixed with neon or other rare gases as well as in the production of a so-called white light. However, the main use of helium still remains for lighter-than-air craft. Due to the fact that the lifting power of helium is 11-12ths that of hydrogen, and it will not burn or explode, it is admirably suited for this purpose. Fortunately, we in the U. S. do not have to rely on the atmosphere for helium but can get it from Western and South-Western natural gases.

One commercial application of helium that has recently been developed is that of replacing chlorine for treatment of aluminum for castings. Helium is injected into the molten aluminum in the bottom of the kettle and allowed to bubble through the molten mass forcing out air bubbles and bringing any other impurities to the surface. The cost of helium in this operation is reported to be lower than chlorine for this work and the further advantage of using a more pleasant gas is obvious. We may expect additional uses for helium in certain fields because of its high heat conducting property.

Krypton and xenon have practically no commercial use at this time although the former is used, to some extent, mixed with neon and other rare gases in discharge tubes. However, we must remember that ten years ago we could have said that

neon and some of these other rare gases had no commercial use in any quantity. Xenon has been suggested as a means of measuring X-rays. Since X-rays are absorbed by gases in proportion to the fourth power of the atomic number, xenon should be suited for this use since it has the highest atomic number of any of the gases (54).

Nitrogen is the one gas which we have available in enormously large quantities but unfortunately the possible applications require only a relatively small amount of this gas and the output is practically limited to what can be disposed of on the market. At ordinary temperatures nitrogen is inert and does not react chemically, in this respect being similar to the rare gases and providing a cheap source of supply of an inert gas. As far as commercial application is concerned, nitrogen is used principally as an inert gas to insure absence of oxygen. For example, it is used in packing food products such as powdered milk, substitutes for mothers' milk, nut meats and tobacco; it is used by the Ordnance Department of the Army for filling recoil mechanism chambers; certain types of incandescent lamps still employ nitrogen and it is used for flushing or purging the bulbs before filling with argon when that type of lamp is produced. Thermometer tubes are filled with nitrogen. It finds application where a dry gas is required—for example, in testing and maintaining telephone lines under pressure. It is also used for pressure purposes, testing and purging pipe lines, pressure vessels, etc.

One of the newer uses for nitrogen which we may expect to increase its application is in connection with bright annealing of stainless steels and other metals. Hydrogen and other reducing gases have been used for this purpose but there is always a hazard connected with their application. A non-explosive and non-inflammable mixture can be provided by using sufficient nitrogen to serve that purpose but leaving enough hydrogen present to give the reducing action that is required.

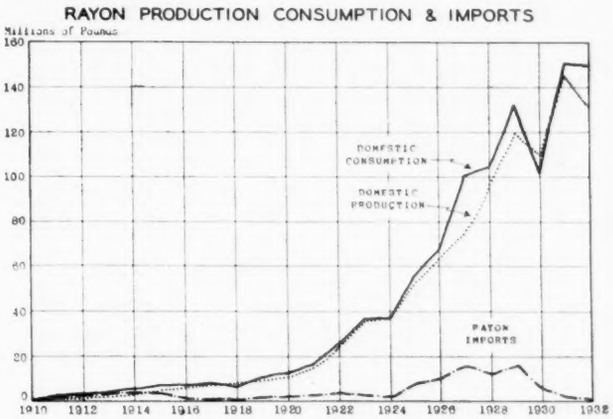
1932 Rayon Statistics

Through the courtesy and cooperation of rayon producers representing approximately ninety-five per cent. of the domestic industry, it is again possible to publish the official annual statistics of the rayon industry, as was first done for 1931. Needless to say, the data presented is on the basis of one hundred per cent. of the industry, the non-reporting capacity having been estimated to this end.

Rayon production for 1932 totaled 131,000,000 pounds which represents a decline of ten per cent. from the total of 144,800,000 produced in 1931. It should be noted immediately, however, that this relatively low total for 1932 takes into account the very inactive period of roughly mid-April to mid-August. As has been emphasized in more recent statistics, the industry has been producing and selling on approximately a 100 per cent. schedule for the past four months.

This current activity is reflected in the stock figures which show that 1932 year-end inventories amount to only a three weeks supply as against a "normal" seven weeks supply at the end of 1931. These December, 1932 stocks were probably lower in relation to sales than they ever have been before.

Domestic consumption of rayon in 1932 was again ahead of production, as indicated by the decrease in stocks, and in spite of an export balance for American rayon in international trade. Incidentally, this rayon export balance set another precedent for the American rayon industry, even though the said export balance was but a very modest one.



The production of yarn by process shows a decline in the viscose process yarn made, from 87.8 per cent. of the total production in 1931 to 80.8 per cent. of the 1932 total. It is believed that the relative increase in the production of "other" yarns was probably shared fairly equally by the acetate, cupra-ammonium, and nitrocellulose process yarns, although the data of itself does not indicate this observation directly. The production of yarns by denier shows the heavy concentration of production on the fine deniers in "other" yarns, as contrasted with the viscose output. Further, the increase in the relative production of fine deniers from 1929 to 1932, and even from 1931 to 1932, is clearly indicated; this is true mainly in the viscose process, however, the production of fine denier "other" yarns having shown a percentage decrease.

The 1932 figures of distribution by trades, compared with revised 1931 data, indicate a continuing increase in the rayon yarn going into woven goods. This increase took place not only in viscose yarn sales, but also in the sale of "other" yarns, even though the preponderant sales of "other" yarns continue to be in the knit goods field. Further, the increase in takings of yarn by woven goods manufacturers shows up in both the cotton goods and the silk goods field. In the knit goods field, the principal decline was in the takings of yarn by underwear manufacturers.

Units are thousands of pounds

	(1)	(2)	(3)	(4)
		Foreign Trade		
Year	*Domestic Production*	*Imports*	*Exports*	*Domestic Consumption*
1911	365	1,800		2,100
1912	1,110	1,513		2,625
1913	1,820	2,300		3,875
1914	2,420	2,527		4,975
1915	4,330	3,000		7,125
1916	5,775	965		6,700
1917	6,540	533		7,225
1918	7,390	121		6,000
1919	8,230	1,072		9,200
1920	10,260	1,480		11,500
1921	15,000	3,276		17,500
1922	24,400	2,116		26,000
1923	36,000	3,029		37,500
1924	38,500	1,712		38,200
1925	51,902	7,001	148	54,750
1926	63,600	10,063	400	66,250
1927	75,556	16,236	401	100,400
1928	97,900	12,734	196	104,500
1929	119,500	15,950	223	132,250
1930	110,000	5,649	345	100,300
1931	144,800	1,530	314	151,000
1932	131,000	165 est	690 est	149,500

Not Reported Separately for 1924 and Before

Production figures: 1911 to 1920, The Viscose Company; 1921 to 1928, except Census years, Daily News Record. Imports and exports: U. S. Dept. of Commerce. All other actual and estimated figures are by the Textile Organon. 1931 data revised.—*Textile Organon.*

What Is Patentable in Chemistry?

By Robert E. Sadtler, LL.B.,
Registered Patent Attorney

One patent application in five is valid; one of every six patents granted becomes the subject of litigation; a quarter of the 100,000 patents granted annually are of a chemical character. Which are three good reasons for reading this patent article with care.

BOTH chemists and executives should be familiar with what is patentable in chemistry in order to protect themselves and their companies. Only patented ideas belong to the inventor, and through a patent alone can he transfer legally his priority rights in his invention. All of the decisions are made by the United States Patent Office and the Courts on the basis of what is new or patentable. If inventors were more familiar with the workings of the Patent Office and its requirements, they would be able to save both time and money in trying to obtain patents on inventions that have previously been made or which are of so little value as to be useless in the promotion of progress. Much money is also wasted in suing infringers on what are thought to be valid patents, only to discover that the Court doesn't even hold the patents valid.

The field of chemistry, although well developed, is still in an embryonic stage as concerns its future possibilities. The Patent Office is, therefore, loathe to lay down a definite set of rules as to what is patentable in chemistry. The Courts too have recognized that because of the variety and form of elements which enter into chemical inventions that they are different from mechanical devices. From cases passed upon by the Patent Office and Courts, however, a set of negative rules may be developed which are of great importance and use.

There are twelve such rules. Most of them are only slight variations from others, but each slight change is exceedingly important. The slightest error in patent work, or a misinterpretation of facts, or a neglect of all available features may cost thousands of dollars.

First of all, to be patentable, a new, useful and unobvious result must be achieved. A mere duplication of a device or its parts cannot be patented, and it must go a step further in the variety of its uses. Patentability is based upon newness, and not upon extra uses to which an old device, composition, or process may be put to produce a more satisfactory result. A new use is apt to be held to be too obvious to the layman, and does not effect the necessary new and unexpected result. For example, in Slawson vs. Grand Central Railroad Co., 107 U. S. 649, two glass panes instead of one, in a fare box, so that the conductor and his passengers might both read the amount, was held merely a duplication of the former result. The case of Goss Printing Co., vs. Scott, Fed. Rep. 253, concerning the idea of the banking of one printing press upon another was allowed, because the new combination dispensed with angle bars, as well as with a web-deflected course, producing a new result, and achieving a straight-line duplex press.

In negative rule Number Two, the Patent Office has said that the changing of form, proportions or degree in carrying forward the original thought by substantially the same means to produce better results does not constitute real invention. For instance, in the case of Continental Fibre Co. vs. Formica Insulation Co., 287 Fed. 455, where something was done more thoroughly, it was not held by the Court to be patentable. This concerned a laminated board uniformly saturated with a phenolic condensation product to form a homogeneous product. More skillful workmanship and care in selecting materials did not make a new invention. In connection with the change of the relative amount of ingredients in Spill vs. Celluloid Mfg. Co., Fed. Rep. 630, a patent on dissolving celluloid in camphor and alcohol was refused because, in Patent 97,454 alcohol had previously been used of less strength but still sufficient. There are exceptions, though, such as the case of Bakelite Co. vs. Brunswick-Balke-Collender Co., 7 Fed. Rep. (2nd) 697. Baekeland was able to control for the first time the condensation reaction and stop it at any one of three stages, by reducing the amount of basic catalyst to less than one-fifth of the equimolecular proportion of the phenol that was used.

Rule Number Three concerns a similar topic, the

substitution of superior materials for inferior ones in the making of parts does not constitute invention unless new uses and properties unobvious from the change are developed, a new construction made, or else cheaper production and durability is effected, as well as more efficient action. There are many well-known examples of this. For instance, Ex parte Egerton 1924 C. D. 99. Here a phenolic resin was used instead of a rubber coated fabric for the connecting strip between the rim and solid tire. Another simple illustration was the substitution of celluloid instead of ivory for piano keyboards in the case of Celluloid Mfg. Co. vs. Tower, 26 Fed. Rep. 451. But, here again there are exceptions. An interesting one relates to the use of rubber in the well-known and necessary artificial gums and teeth. In the case of Smith vs. Goodyear Dental Vulcanite Co., 93 U. S. 86, the change in material resulted in the elimination of spaces for foods and acids between the teeth.

Rule Number Four is that the omission of one or more parts or elements is not invention unless a new mode of operation is brought about of the parts retained, or a worth-while simplification of the construction or remaining elements, obtaining as good or better result than with the greater number of parts. Mere omission and elimination of the function of the element omitted is not enough. Something more must be done.

Adjustment of an Element

The adjustment of an element when no new and unexpected result is obtained is not a subject for a patent. The case of Houser vs. Starr, 203 Fed. Rep. 264 is an example of this rule Number Five. It was held that making a tool adjustable in four directions instead of two does not constitute invention.

The Sixth Rule is concerned with a question fundamental in patent law. To obtain a patent upon the invention it must be one not perfectly obvious to one skilled in the art, and which cannot be prepared whenever desired by a skilled chemist or mechanic, although the patentee is not required to bring his invention to the highest degree of perfection, nor must the patent define the best commercial processes or indeed one that is commercial at all. The public must be able to avail itself of the patent on expiration. But would an ordinary individual skilled in that particular art immediately see and put into effect the change supposedly represented by the invention? If so, it is not patentable. One of the outstanding examples of non-patentability for mechanical changes only appears in the case of Western Electric & Mfg. Co., vs. Formica Insulation Co., 272 Fed. Rep. 667, Patents 1,167,742 and 1,167,743 assigned to Conrad. The patents concerned the mere omission of end shrouds or reenforcing plates of a gear made of Bakelized Micarta formerly invented by Baekeland. Careful selection to perfect mechanical skill and involving nothing more appears in the case of Welling vs. Crane, 14 Fed. Rep. 570, Patent 98,727 granted to Welling for a mixture of finely-divided cotton or wool and powdered shellac mixed dry to form an artificial horn.

Many devices are not portable, and it would seem that anyone who could make an old device portable would be performing a distinct and valuable service, worthy of recognition. But, not so, for in a very few cases is the necessary new and unexpected result obtained. Only under these conditions would it be patentable. The non-patentability of old devices made portable involves negative rule Number Seven.

Many inventions have come into the Patent Office in which an equivalent was substituted in an old device or composition. The Courts have ruled however that equivalents, producing substantially the same result, do not make for invention. The forms, the shape, nor the words in which the invention is written up do not alter the matter. A good example is the case of Root vs. Sontag 47 Fed. Rep. 309, in which a bolt and a screw were held to be equivalents. The same thing was true in Welling vs. Crane, 21 Fed. Rep. 707, in which porcelain, argillaceous earth, etc. were considered equivalents of kaolin in a plastic composition, containing kaolin, shellac, and coloring matter. In another case, copper sulfate was held as the equivalent of metal salt previously used as hardening agent in plastic paving compositions containing a finely divided filler, a mineral asphaltic binder, and a hardening agent, Western Willite Co. vs. Trinidad Asphalt Mfg. Co., 16 Fed. Rep. (2nd) 446. These are included in negative rule Number Eight.

This is the broad, general rule, but in the case of chemical patents the Patent Office permits, and the Courts recognize a different rule of construction than that which applies to mechanical cases. In chemical cases it is permissible to use equivalents. One material or its equivalent may be mentioned, but this is not permitted in mechanical cases. The Courts rely upon the opinion of experts, and substitution of one element for another may often prevent a case of infringement of a claim. Unless,however,it has the same characteristics and the combination is the same, then infringement is not avoided.

Many inventors have thought that merely changing the relative location of parts of an old device constituted a new invention. The courts did not agree, and thus we have rule Number Nine. In the case of National Binding Machine Co. vs. Harper Paper Co., 242 Fed. Rep. 939, a cutting knife was placed behind instead of in front of a moistener, a mere reversal. In another instance, two shafts connected for operation by gearing were angularly changed. These were not granted patents. But, in the case of Hoyt vs. Horne, 145 U. S. 302, in working with rag engines a new and unexpected result was obtained and this was held patentable. Hoyt, in his patent Number 303,374, effected a new result over that produced prior

to his patent when rag engines were generally constructed with a vertical midfeather. Hoyt provided a horizontal midfeather, extending from the beater roll to the other end of the vat, and placed the beater roll in one end of the vat, causing an unexpected increase in heating action, because the fibrous material and liquids were carried from the lower section between the knives and deposited over the top of the beater roll into the upper section.

Manner of Application

Oftentimes the application of an old device or process to a similar or analogous subject has been attempted and found to be unpatentable because no material change was made in the manner of applying it, although the result was never before contemplated. This is rule Number Ten, the rule of double use. However, an inventor may take over a device, composition or process in an art remote to his about which he is not expected to know the solution, as would be the case in his own and analogous arts, to produce a new result without any material change in construction. Generally these results are held to be mere double uses, as in the case of making artificial bands, streaks, etc. in celluloid. This was held to be analogous with the same result produced in cement—Arlington Mfg. Co. vs. Celluloid Co., 97 Fed. Rep. 91. Patent No. 546,360 to Stevens was held invalid over Patent No. 211,860 to Mehling. Here an attempt was made to get a patent on lifting sheets of paper by suction when previously buttons, pills and nail heads had been lifted in the same manner. In another case the transfer and adaptation of a machine for coating glass and emery paper to the art of coating paper with gelatin emulsion for photographic use was rejected as analogous use—Eastman Co. vs. Getz, 84 Fed. Rep. 458. Previously mention was made of those which were held to constitute invention and not just double or analogous use. Some examples of this are a cylinder for polishing wood and a cylinder for disintegrating clay, Potts vs. Creager, 155 U. S. 597.

In some cases considerable change has to be made in the old device to cause it to produce the new result. This is much stronger evidence of invention, as in Potts vs. Creager, when a series of peripherally extending glass strips or bars had to be replaced by steel bars in a wood polishing machine to make it effective as an operative clay disintegrator. But in the case of Eastman Co. vs. Getz, 84 Fed. Rep. 458, the necessity of increasing the distance between the coating and driven rolls to give more time for the drying and setting of the gelatin emulsion in converting a glass coating machine into one to coat paper the Court was of the opinion that this change would be necessary and naturally occur to a skilled mechanic who was confronted with this sort of problem. A patent was not granted.

Rule Number Eleven holds that making two parts integral that had previously been separate and vice versa does not make an invention unless the new combination produces some new or additional function which was not readily observable. Mere additional strength does not create such an exception.

The last negative rule, Number Twelve, says that mere aggregation without unity in the parts of a device or composition with the element or elements remaining unchanged, and where no new function or new effects are produced due to their action upon each other or their joint action upon the combination, there is no invention. An eraser is not considered necessary to the writing function of a lead pencil, so that in the case of Reckendorfer vs. Faber, 92 U. S. 347, a patent was refused on these grounds. Again, two machines on a single bed-plate for performing successive operations on a single piece of material were held unpatentable. But, if several elements are brought together so that the necessary additional functions are performed and additional effects produced, this union gives real grounds for a patent. The final result is unitary and produced by the joint coaction of all the elements. Michigan Carton Co. vs. Sutherland Paper Co., 29 Fed. Rep. (2nd) 179, involved patent No. 1,316,120 held by Sutherland was held valid by the Court, because although all steps in sealing waxed cartons by dewaxing, gluing and pressing the surfaces together were individually old, they produced a new and unitary result. Sometimes mechanical elements may be new and therefore patentable. In such a case, patent protection may be obtained on the combination and each of the new elements. But, a new result must be produced by the coaction of the element substituted with the remaining elements before patent protection can be gained.

Classifications for Patents

Now, it would be well to find out the classifications in which the subject matter must fall in order to make it possible to secure a patent. Number One, an art, has been defined as follows: a method or process for producing a result. The Supreme Court definition says that an art is a mode of acting on matter to produce a given result.

Number Two, concerning process, which is often used synonymously with art, but may be defined alone as a way of obtaining a useful result in successive steps. If these steps are not independent of the apparatus, form or kind of tools used in performing them, the Courts will hold any claim covering the process as invalid, being merely for the function or mode of operating the machine. If the process can be carried out by more than one form of tool it is a true one, otherwise not. It is possible that a new machine may be used. In that case, both the machine and method may be patented, either separately or together.

Number Three, a machine, is defined as an instrument capable of producing, when set in motion,

certain predetermined effects by its own operation, and composed of one or more mechanical powers.

Number Four states that a manufacture is that which is produced or made by the industry of man alone, not being a composition, a machine, or a deisgn.

Number Five relates to an improvement on an already existing art, machine, manufacture or composition of matter. This includes an improvement on an already existing art, machine, manufacture or composition of matter.

Number Six concerns a design for an article of manufacture. Design may be defined as that which gives a distinction or peculiar appearance to the particular article of manufacture.

Patent Office Definitions

Of course, any chemist knows the definition for composition of matter, but it is also well for him to understand how the Patent Office defines it. The Patent Office says that it is the result formed by the intermixing of two or more substances, whether it is a chemical union, or mechanical mixture, or gives evidence of both, and whether the ingredients are fluids, solids, or gases. Comparing an article of manufacture with a composition of matter the chances for patentability lie in the novel combination of ingredients, while in the case of an article it is dependent upon its own inherent characteristics. It follows from this that an article may be composed wholly or in part of a composition of matter, which in itself alone may be novel and form the subject matter of a patent. It is essential that the product of a process must be in commercial form and not in an intermediate stage before there can be any chance of obtaining a patent upon it.

The machine used is independent of the article which is made. A new composition of matter usually provokes scientific research, so that various new methods of preparing it are often evolved. The resultant uses and applications of the new composition oftentimes form the basis for valid and worth-while patents on the machines, articles, compositions, and methods. This is a very important point that from the pioneer work many improvements may be made which will afford opportunities for all of the patents mentioned above. The inventor should not overlook any possibilities in his invention nor limit the scope to seeking only one patent when others might be had which might be even more valuable than the original one sought.

In this connection, an old composition in a different state of condition may be held patentable as a new composition. For example, the use of an artificial plastic in a solvent which might also be used as a varnish or when mixed with a filler be used as a molding composition. Today most of the patents being applied for are only improvements on some basic patent. But, there is still the possibility of patents based upon basic and generic inventions. Improvement may be defined as an alteration in or addition to some machine, composition, art, or manufacture already in existence.

Many discoveries and inventions, as we have seen, fall outside of the pale of what may expect patent protection, and causes and effects, and abstract laws of nature fall into this classification. In the famous case of Morton vs. New York Eye Infirmary Co., 5 Blatchford 116, the Courts held that, although it was an exceedingly important discovery, the insensibility produced in human beings and animals by ether did not constitute the subject matter of a patent. In another instance, when it was found that carrying out at night or in foggy weather the old process of fumigating plants or trees with hydrocyanic gas, when they had been covered with an oiled tent with the absence of the actinic rays of the sun, a patent was refused. The principle of nature itself is not patentable. When, however, it is utilized by means of an art, manufacture, machine, or composition of matter, if properly expressed in one of these forms, it is then patentable. Following this policy, Morse was allowed patent protection on his telegraph apparatus. The policy and purpose of the Patent Office to protect the principles of nature and the utilization of forces in not allowing the abstract discoveries patent protection has reacted very favorably and very beneficially in the promotion of chemical industry.

What is Invention?

In conclusion, a summing up of what is invention might be helpful.

1. The production of a new result by the assembly of old elements into a new combination is invention.

2. A process which includes a new combination of elements or a new combination of steps is invention.

3. Old and well-known machines may be used if in the process a new result is produced, formed of a new combination of elements or new ways of treating materials. This is invention.

4. Important to chemical inventors is the provision that the claims may mention two or more equivalents or chemicals which is not allowed in mechanical patents.

5. The anticipating material used to anticipate a patent, whether of prior use, prior publication, or prior patent, must disclose the invention to such an extent that the necessity for explanation or reconstruction to make it fit the patent which is being anticipated is omitted.

6. The patent specification must give clear information as to a practical way of practicing the invention to give the desired result, it must clearly disclose the method of making the product, the process, or composition, so that anyone skilled in the art to which the invention pertains can readily produce it.

CO_2 finds new uses

By J. H. Pratt
Vice-President, The Liquid Carbonic Corporation

Modern trucks designed to meet use of solid CO_2 in transporting refrigeration.

DURING the past few years solid carbon dioxide development has naturally replaced the liquid product for certain uses, particularly in the refrigeration field. However, cylinder gas does and will retain, many uses exclusively on account of its maximum purity and convenient features. The present normal production of carbon dioxide in cylinders is estimated at approximately 75,000,000 pounds per year. This is made by several processes, but the bulk of it is still made by the well-known coke process in some forty plants operating in the United States.

The Coke process, [1], [2], is the natural by-product process, as it consists primarily of a highly efficient power plant generating enough power for its own use and at the same time taking its raw material from the flue gases generated under the steam boilers.

A considerable portion of the liquid production comes at the present time as a by-product from the manufacture of alcohols, and a small percentage is still recovered from natural wells. The purification of by-product gases is more difficult to control than is the coke process, and the production of natural CO_2 is a small factor, due to the inaccessible location of such natural supplies. The uses of CO_2 can be divided into several general groups and will be discussed in the order of their magnitude.

Beverage Uses

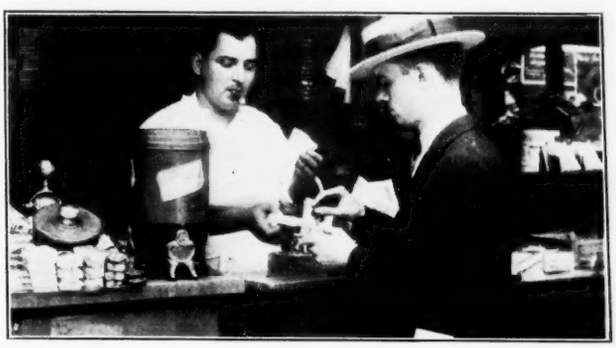
At least 90 per cent. of the total production of liquid CO_2 is used in the beverage industry, for the production of carbonated beverages by both the soft drink bottler and the soda fountain operator. The main reason for carbonating beverages is to furnish the taste which has become popular in this country, and at the same time it performs other functions. Most authorities agree that carbonated beverages stimulate the gastric juices [3] and improve the appetite, which, coupled with a good advertising campaign, has popularized the so-called "three o'clock pick-up." Carbonation tends to bring out fruit and herb flavors and it has at the same time a preservative action on the product, which has made it possible for well-known companies to do a national business on ginger ales and root beers, due to the fact that they have an almost indefinite shelf life when highly carbonated. Research [4] has shown that high carbonation has a definite germicidal effect on bacteria always present in such products, the beverage actually tending to become sterile upon standing.

The second largest use for liquid CO_2 is in the refrigerating industry. [5] [6] Due to the fact that practically all other well known refrigerants are injurious to plant and animal life, carbon dioxide systems have come into general use where slight leaks or accidents would be dangerous to large assemblies of people, consequently it is used in theatres, hotels, hospitals, department stores, and for the same purpose on many sea-going vessels. The entire charge of carbon dioxide from an ordinary refrigerating plant can be safely emptied into the engine room, as the amount can run up as high as 10 or 15 per cent. [7] in the atmosphere without danger, whereas fractional percentages of other refrigerants often cause death. The fact that it alone among refrigerants is heavier than air tends to keep leakage in the basements and does not cause panics, as would occur through the leakage of the more irritating and lighter gases. Due to the fact that it does not injure merchandise, it is gradually coming into general use for cooling fur storage vaults, florist shops, and similar commercial establishments.

Carbon dioxide refrigeration is also becoming popular and often necessary in some of the newer industries requiring extremely low temperatures. By using another refrigerant, such as ammonia, for cooling the CO_2 condensers, it is commercially possible to operate the carbon dioxide system so as to produce temperatures as low as —50° F. These temperatures are advantageous in connection with quick freezing processes and for the manufacture of other bottled gases. Certain ice cream manufacturers have also found that

they can produce a better grade of cream by maintaining extremely low temperatures in their hardening rooms. This combination of two refrigerants, the two compressors often driven from the same motor, overcomes the high pressures required on ordinary carbon dioxide systems and materially increases the over-all efficiency, particularly with high temperature condensing water.

There has been prejudice against the general use of CO_2 as a refrigerant on account of the high pressures, and due to the misconception that the power requirements [8] are greater per ton than for other refrigerants. Where comparatively cool water is available for condensing purposes, it has been found that the over-all power requirement for all refrigerants is approximately the same, and with present day construction methods the disadvantages of high pressure have generally disappeared.



Refrigerated containers make it possible for increased handling of refrigerated products by retailers.

Carbon dioxide refrigerating units are now made commercially in sizes from one-half to 250 tons capacity, and recently published [9] information giving accurate physical data on carbon dioxide has made it possible for engineers throughout the world to consider it in their calculations.

While CO_2 is one of the main raw materials in many chemical industries, there are only comparatively few processes which require the use of pure bottled CO_2. In many cases the cylinder product is used in the early experimental stages, with the ultimate result that when the process is put on a commercial basis it is found that lower percentages can be used and the manufacturer naturally turns to the production of his own CO_2 as purified flue gas giving approximately 15 per cent. CO_2.

On the other hand, there are certain industries which definitely require higher concentrations or desire the convenience of the high pressure, and in these cases the bottled product continues to be used.

The rubber industry is a fertile field and considerable quantities are now being used in connection with the manufacture of tires, where it is found that the curing time can be reduced and quality improved by using an atmosphere of CO_2, and research is now being carried on which indicates that its use can be greatly broadened in the rubber field.

A comparatively large use for CO_2 has been developed in the last few years in connection with the aging of cement products. Portland cements ordinarily age through the absorption of CO_2 from the atmosphere, and in the case of small products such as cement shingle, it has been found commercially advantageous to increase the rapidity of this aging process through the introduction of pure carbon dioxide. This process removes the possibility of spotting colored shingles by converting the free lime to the more insoluble carbonate inside the shingle—instead of on the surface. This improvement in quality, plus the fact that it speeds up the manufacturing process and reduces inventories, makes it commercially applicable.

Small quantities are also used for the treatment of hard drinking waters, although in the larger installations purified flue gas has replaced the pure product. Small quantities are also used for boiler treatment, as the introduction of carbon dioxide into a heavily scaled boiler often changes the carbonates to bicarbonates, changing the solid mass to one of a spongy nature which can be more easily removed. Pure carbon dioxide is being used to a small extent in the manufacture of Carter process white lead, and while certain manufacturers are using the diluted flue gas, there seems to be still some doubt whether the use of the more expensive material does not pay on account of better yields and improved quality.

Carbon dioxide has been used as a leavening agent for bread, but this has been discontinued as the public requires the yeast taste. Certain packers of food

Refrigeration with solid carbon dioxide enables the retailer to ship such things as fish etc. by airplane.

products use considerable quantities for preventing the oxidation of their canned goods by replacing their top air with pure CO_2, instead of depending upon the usual vacuum method. Small quantities of the liquefied product are still used in the manufacture of salicylic acid and as the vehicle for certain inflammable distillation processes.

Carbon dioxide extinguishes fires as a blanket by excluding oxygen, and prevents them by diluting the

oxygen content of the air below the combustion point. Most city fire departments now carry special CO_2 equipment, which can be used to advantage in basement fires or those occurring in other closed spaces. Also used to advantage on curtains, furniture, etc. Wherever it can be used in place of water it naturally reduces the loss, which in many cases is due more to water damage than to the actual fire.

Experimental installations of automatic CO_2 equipment have been made in certain large generating plants for protecting the electric generators and for maintaining an atmosphere of CO_2 over transformer oils. Unfortunately, for the carbon dioxide manufacturer, fires do not occur often enough in installations of this kind to give many actual tests, but as far as is known the automatic equipment already installed has functioned satisfactorily. Comparatively large quantities of carbon dioxide are used for fire extinguishing systems on vessels of one kind or another.

Mechanical Uses

One of the most interesting and rapid developments in the use of liquid carbon dioxide during the past few years has been its use in the mining industry, replacing high explosives.[12]

Its advantages are: first, safety; and second, a higher grade product, particularly in the coal mining field.

Small heavy steel cylinders in sizes varying in capacity of from one to four pounds each are loaded with liquid carbon dioxide under approximately 1000 pounds pressure. The cylinder or cartridge as it is called, is equipped with a combination electric and chemical heating element and is placed in the bored hole in the mine exactly as a stick of dynamite would be used. Current is applied to the heating element which causes a very high pressure, breaking a heavy frangible disc, causing an explosion which heaves the mine seam. The explosion is slower than that generated by high explosives and for this reason, particularly in coal mines, a smaller percentage of fines is produced, with the result that the average product of the mine can be sold for a higher price. The safety feature of this process also allows miners to be operating near the section which is "shot" and considerable mining time is saved in this manner. The cartridges are not injured and are equipped with new discs and refilled for repetitive use.

Since most insects require oxygen for existence, carbon dioxide is coming into use in connection with the storing and treating of grains and cereals. Research work which is now going on in one of the universities indicates that the insect life in stored grains can be entirely eliminated by the use of carbon dioxide over long periods, but that these results can be produced more quickly and safely by mixing a small percentage of certain insecticides with the carbon dioxide. In the past a great many grain elevators have been treated with insecticides which were dangerous on account of either their inflammable or poisonous properties, and the new method obviates both dangers with equally good results.

In the same connection, the use of CO_2 eliminates the danger of dust explosions in grain elevators and cereal factories, and most grain grinding is now done in an atmosphere containing enough CO_2 to prevent explosions; but here, unfortunately, purified flue gas can be used as well as the pure product. Work is also being done to develop the use of household insecticides, using carbon dioxide as the mechanical power for spraying.

As the effect of moderate percentages of carbon dioxide in the air is to increase the respiration rate, this property is used advantageously in the treatment of certain sicknesses. Hospital and public service companies equip their first aid squads with mixtures of carbon dioxide and oxygen for use in resuscitating victims of carbon monoxide poisoning [13], and in the hospitals it is used for treating certain types of pneumonia and heart diseases. Carbonated baths, particularly some of the better known German baths, supposedly have their healing qualities due to the high percentage of CO_2 in the water, and equipment for carbonated baths in the home is now being offered by one or two companies.

Carbon dioxide gas is being used in many large cities at the present time for the humane killing of animals. Illuminating gas was formerly used for this work, but a fatal explosion occurred a few years ago and CO_2 is now being used on account of its safety.

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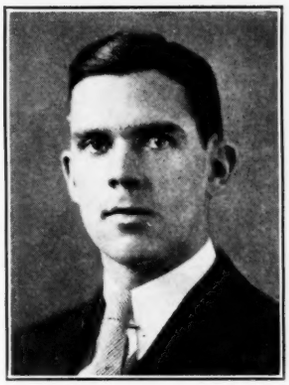
World Nitrogen Production

World nitrogen production during the year ended June 30, 1932, totaled 1,553,704 metric tons, as compared with 1,694,288 metric tons in the previous year. The total production includes 170,000 tons of nitrogen as Chilean nitrate, as compared with 250,000 tons in the previous year. Consumption of manufactured nitrogen for 1931-32 was estimated at 1,421,580 metric tons plus 138,208 tons of nitrogen in the form of Chilean nitrate, making a grand total consumption of 1,559,788 metric tons, as compared with 1,621,305 in the previous year. The fiscal year 1931-32 was the first period since 1926-27 during which consumption exceeded production, although, in the case of Chilean nitrate, the estimated consumption was 32,000 tons of nitrogen (200,000 tons of product) less than production.

Sulphonated Fatty Alcohols



By Samuel Lenher
E. I. du Pont de Nemours and Co., Inc.

SULPHONATED oils show a number of advantages over soap, which make them superior in some respects to the alkaline salts of fatty acids. Some of these advantages are, resistance to the formation of calcium and magnesium salts and a freedom from any considerable hydrolysis which yields alkali in dilute solution. However, sulphonated oils and sulphonated aromatic products do not possess detergent properties and, therefore, cannot be generally used as soap substitutes.

In the last decade certain new compounds have been developed which are true soap substitutes, and which combine all the characteristic advantages of soaps and sulphonated oils with certain additional valuable properties. Certain of these compounds are the sulphonated fatty alcohols.

The fatty alcohols are prepared from the corresponding fatty acids or their glycerides, which occur in cocoanut oil, cottonseed oil, corn oil and other fatty raw materials. The alcohols are prepared by the catalytic reduction of the fatty acids by hydrogen under pressure to yield the corresponding fatty alcohols, as $RCOOH + H_2 +$ suitable catalyst $\ldots\ldots\rightarrow RCH_2OH + H_2O$. Mixtures of the fatty alcohols are fractionally distilled and the desired fraction sulphonated directly to yield the fatty alcohol sulphonate. Sulphonation can be carried out in a number of ways to yield the alcohol sulphonates.

The reaction between the sulphonating agent and the alcohol yields the true half sulfuric acid ester of the alcohol. $RCH_2OH + OHSO_3H \longrightarrow RCH_2OSO_3H + H_2O$. This half sulfuric acid ester of the alcohol is neutralized with caustic soda to form the sodium salt, which has been given the trade name, Gardinol. The structure of these compounds has been proved and it is established that the linkage between the alcohol and the sulfate radical is an ester linkage, the union being made through oxygen, C-O-S. The corresponding sulphonic derivatives, in which the linkage is carbon-sulfur-oxygen (C-S-O), that is, the true sulphonates are stable compounds, but are not strong detergents like the ester derivatives. Sulphonated fatty alcohols in which the sulphonic group is alpha, that is, adjacent to the primary alcohol group, are good wetting agents and detergents and are stable, but when the sulphonic group is in the middle of the carbon chain the detergent properties are missing. Secondary alcohols and branched chain alcohols show little or no detergent action on esterification with sulfuric acid. In this paper when sulphonated fatty alcohols are mentioned, the compounds under consideration are the half sulfuric acid esters of the fatty alcohols.

These sulphonates show detergent properties which are, in general, similar to the properties of the sodium and potassium salts of the corresponding fatty acids. The sulphonated fatty alcohol prepared from lauryl alcohol ($C_{12}H_{25}OH$) has been given the trade name Gardinol W A, while the oleyl derivative is called Gardinol C A. The higher fatty alcohol sulphonates derived from stearyl and cetyl alcohols are called Brilliant Avirols L142, L144 and L168.

The Gardinol C A (oleyl alcohol) probably contains sulphonated alcohol formed by the addition of sulphonic acid groups to the compound at the double bond. This may account for the fact that Gardinol C A is slightly less resistant to chemical treatment than Gardinol W A.

The Gardinols have been thoroughly tested abroad and in this country for general use in the textile field,—abroad over a period of about three years,—and they have been found to equal most soaps under all conditions in which soap is efficient and to be capable of application as detergents in place of soap where soap cannot be used. These products are very stable chemically, and it is probably due largely to this fact that they can replace soap in textile processes. They do not, like soap, hydrolyze in dilute aqueous solutions at the concentrations used in textile processes to yield free alkali; aqueous solutions are neutral and show a pH close to 7.0. The sodium ion in the sulphonate group is partially ionized, but the alcohol-sulphonate radical remain unaltered.

These sulphonates are stable to acids at the boil at concentrations of less than 3%. They are also stable at the boil with caustic soda and are only salted out of solution at strengths of caustic soda approaching mercerizing strength, and even then they are not decomposed. These fatty alcohol sulphonates are extremely resistant to a formation of insoluble salts, even with heavy metals, in a ½% solution. The only metal ions which form insoluble salts at room temperature are aluminum, iron, lead and tin, and even these compounds form Gardinol salts and are soluble at low concentrations. Salts of all the other commonly occurring metals are soluble even in concentrated solutions at room temperature. These products are quite unaffected by the hardness in any naturally occurring waters or by the salt in sea water. Their detergent properties are maintained in full in hard water or in salt water, since the calcium and mag-

nesium salts of fatty alcohol sulphonates show detergent properties which are equal to those of the sodium salt. Since the calcium and magnesium salts are soluble as well as the sodium salt, there is no especial tendency toward the formation of calcium magnesium salts by a metathesis reaction in hard water and there is an equilibrium set up in solution between the sodium, calcium and magnesium salts of these alcohol sulphonates. These sulphonates are not affected by normal atmospheric conditions, exposure or ageing, nor do they oxidize or become rancid with the accompanying development of objectionable color and noticeable odor. Since they are neutral chemically, they have no tendency to tender cellulose fibers, or to weaken animal fibers, as do certain soaps or alkaline materials.

The solubility of the lauryl sodium sulphonate (Gardinol W A) is excellent at room temperature; solutions containing 20% are easily prepared and the solubility increases rapidly with increase in temperature. The oleyl sodium sulphonate (Gardinol C A) is less soluble than the lauryl derivative. Solutions containing 1%-2% are readily prepared at room temperature, and 15% solutions are easily prepared at 120° F. The Avirols are not readily soluble at ordinary temperatures; they are readily soluble at temperatures above 120° F.

Sulphonated fatty alcohols belong to a general group of substances called surface active material. This means that in aqueous solutions, they act to reduce the surface tension of water and concentrate in a film on the surface of the solution. Accompanying the surface activity, we find powerful wetting out and penetrating power, strong emulsifying and dispersing action towards fats, waxes and solid matter, and high detergent power. Detergent action is a process which is a result of a combination of phenomena. The principal characteristic of materials which show the phenomenon of detergency is their ability to greatly reduce the tension at interfaces. These outward appearances of detergent action may be classed as four in number; there will probably be wide disagreement in regard to this classification, as there is no general satisfactory theory of detergency. First, penetration and wetting out which results from the reduction of the tension at the interface between the wetting out solution and the surface of the material to be penetrated; second, lowering of the tension to the air-liquid interface with the accompanying tendency to foam formation on agitation; third, lowering of the interfacial tension at the surfaces of foreign particles, such as fats, oils, or solid material in the scouring medium, which enables them to be emulsified and dispersed in the body of the liquid; and fourth, good solubility of the detergent which allows the emulsified particles to be washed away from the body to be cleaned.

As penetrating assistants, the Gardinols are surpassed in efficiency at ordinary temperature only by the alkali metal salts of oleic acid. As emulsifying agents, the Gardinols are equal to the highest grade soap in distilled water and are greatly superior to soaps in hard water and under acid conditions where soaps may be of actual disadvantage in textile processes. In their emulsifying powers as detergents, the Gardinols are superior to any of the recently introduced synthetic chemicals. The solubility of the Gardinols is excellent, and, as just mentioned, greater than that of many soaps.

The higher sulphonated fatty alcohols, or Brilliant Avirols, are excellent emulsifying agents above 120°F., though not good penetrating agents. They show some penetrating action, but it is not good. The detergent properties of the Avirols are combined with fatty characteristics which differentiate them from the lower fatty alcohol sulphonates, that is, the Gardinols. Their fatty characteristics make the Avirols superior finishing agents for fine textiles. When used on cotton and rayon, the Avirols impart a lustrous appearance and a characteristic soft smooth handle, which appears to be highly desirable.

The general resistance of these fatty alcohol sulphonates to acid, alkali and hard water, together with their penetrating and detergent properties, indicate a very wide field of application for these products. The Gardinols are especially suited to use in all wool processes, except felting and carbonizing. Wool processed with Gardinol has an open, lofty appearance and a very fine handle. This is especially true of loose wool which has been scoured with Gardinol and soda ash. We have found that we can scour wool on a cost and quality basis which is competitive with a soap scour, even at present soap prices. The Gardinols exert no pronounced milling action, but when used for milling in conjunction with soap they aid in penetration and prevent the precipitation of insoluble soaps. The Gardinols have been used as additions to peroxide bleaching baths with success, and we have been able to show a saving in cost. In fulling operations, the Gardinols greatly increase the rinsibility of the woolen goods. In addition to their penetrating action, we have found that the Gardinols, as additions to dye baths, have a slight retarding action during the dyeing process and tend to yield more level dyeings, especially with the more rapid dyeing dyestuffs. The Gardinols are not suitable for carbonizing. When used alone, Gardinol has no felting action on wool and only when used with alkalies do they show the felting action due to the alkali. The Brilliant Avirols find use as finishing materials especially for the higher grade cotton and rayon textiles. Used as an assistant in the dyeing of rayon, they exert a levelling action similar to the Gardinols. In silk processing, Gardinol is being used in the boil-off, part of the soap being replaced by Gardinol.

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Diethyl Carbinol
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Normal Amyl Chlorides
Amylene Dichloride
Diamylene
Diamyl Ether

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CHEMICAL

The Photographic Record

Times World Wide Photos

As befitting so great an honor, the Nobel Prize in Chemistry for 1932 is presented to Dr. Irving Langmuir by the hand of King Gustaf of Sweden.

Recovery of sap to be used in the manufacture of Japanese lacquers from a lac tree native to Japan and China. The motley looking background is a Japanese cemetery.

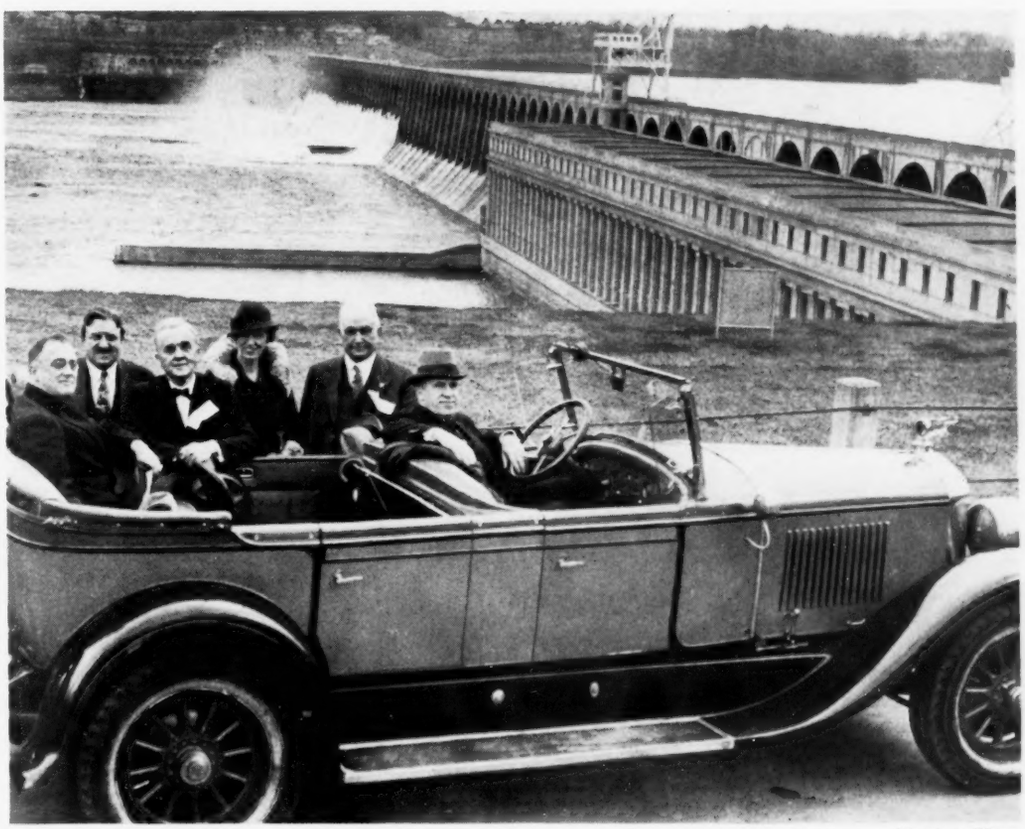
To the left, a good idea of one process in the manufacture of roofing tile in a modern Japanese home-industry plant. Above, drying hand-made paper in Japan—Americans may not want to copy this method but this is the way it is carried on in small home plants.

NEWS REEL

of Our Chemical Activities

Francis J. McDonough, President, New York Quinine, becomes Chairman, Drug and Chemical Section, New York Board of Trade, succeeding Percy C. Magnus, who was selected as president of the Board.

In the private office of John A. Chew hangs the original oil painting by his friend, Norman Rockwell, of what is by far the most famous cover that the "Saturday Evening Post" has ever published.

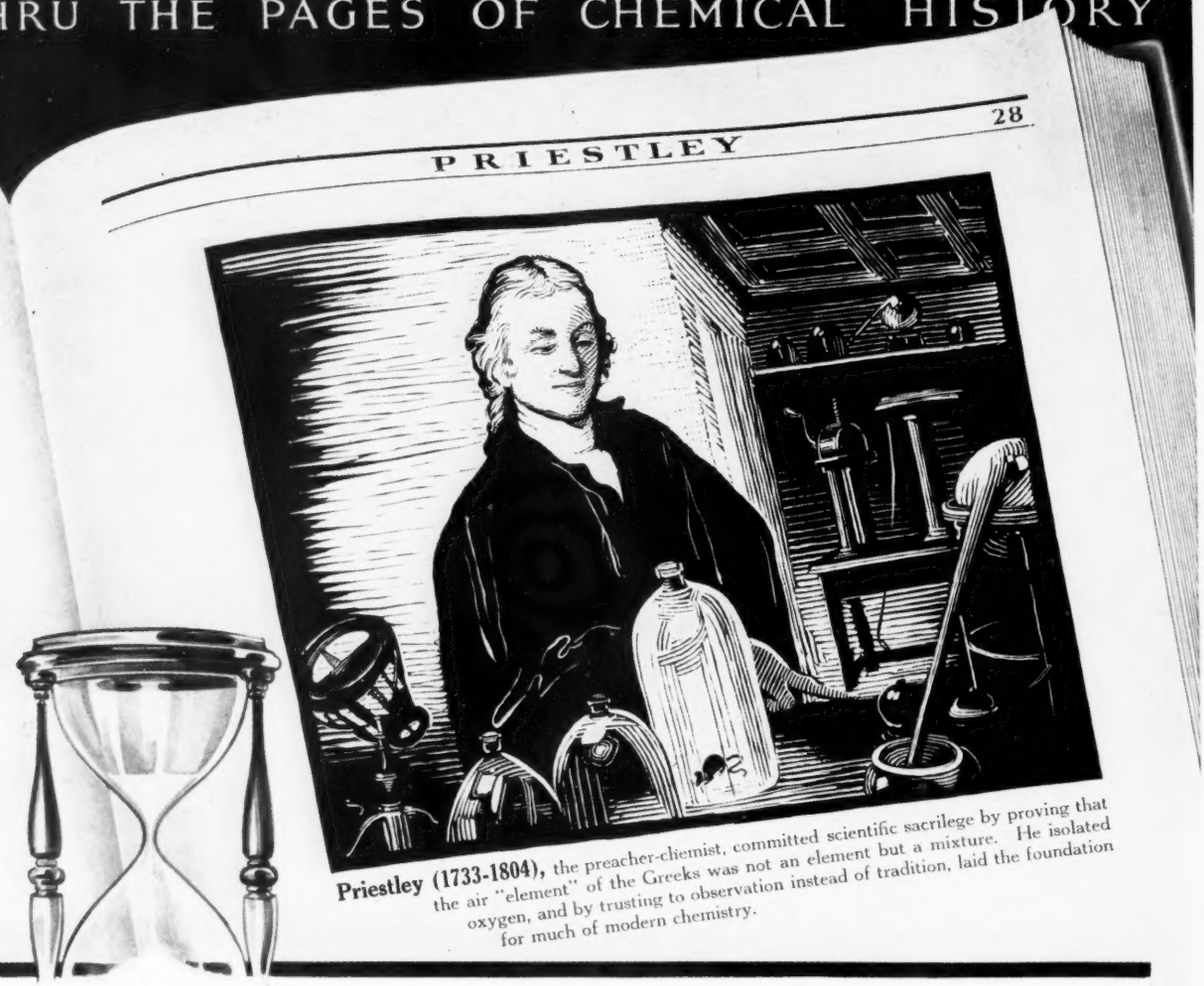


President-elect Roosevelt inspecting the Muscle Shoals project built during the war for the production of nitrogen. Directly to his left is Senator Norris; also Governor McAllister, Tennessee; Senator Dill; Governor Miller, Alabama; and Mr. Roosevelt's daughter, Mrs. Dall.

Keystone Views

LEADERSHIP

THRU THE PAGES OF CHEMICAL HISTORY



Priestley (1733-1804), the preacher-chemist, committed scientific sacrilege by proving that the air "element" of the Greeks was not an element but a mixture. He isolated oxygen, and by trusting to observation instead of tradition, laid the foundation for much of modern chemistry.

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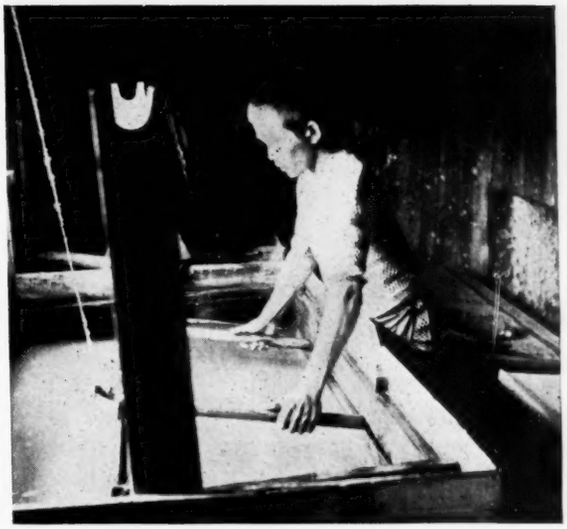
MALEIC ACID
TRICRESYL PHOSPHATE
TRIPHENYL PHOSPHATE
LACQUER SOLVENTS
PLASTICIZERS

Chemical Process Industries in Japan

By Dr. Charles E. Mullin



The manufacture of hand-made paper in Japan.

JAPANESE lacquers were at one time found on the foreign markets, but with the advent of the cellulose lacquers, synthetic resins, and improved gum varnishes, have practically disappeared. Even in Japan the newer lacquers and lacquer-like products have largely replaced the native lac products. The actual production of lacquer of the old type in Japan itself is now rather small and most of that now used in the arts in Japan, as in the manufacture of lacquered boxes, trays, etc., is prepared from juice imported from China. It is claimed that this Chinese product is of inferior quality obtained by tapping the wild trees and improperly refined. The imported lacquers, varnishes, etc., are widely used in Japan at present for the production of articles resembling the old-type Japanese lacquered boxes, etc., the manufacture of imitation cloisonne ware, painting furniture, and the general uses of lacquers, varnishes, and paints in the west.

In 1928 there were 10,284 plants producing lacquered-ware, employing 21,168 craftsmen, and producing articles to the value of 35,962,754 yen (\$17,981,377 at normal exchange). In 1929 goods to the value of 1,818,192 yen were exported, chiefly to the United States, Great Britain, and France. The centers of manufacture are Kyoto, Ishikawa, Fukushima, Aichi, Wakayama, Shiznoka, Fukui, Niigata, Toyama, and Mie prefectures. There is an excellent market for products of this type in all parts of the Far East, provided they are sufficiently low in price and suited for the various special uses of each locality.

It is claimed that the Japanese cloisonne industry is more than a thousand years old. But as this statement is based upon the finding of a cloisonne ornament of that date, there may be some doubt regarding whether this was actually made in Japan. Almost certainly Japan obtained the earlier methods of cloisonne manufacture from the Chinese, along with many of her other arts and industries.

The early methods were almost forgotten, but were revived from the literature, etc., by Tsunekichi Kajo, a native Aichi, in the Bunkya era (1861 to 1863). His methods were copied particularly in the Tokyo, Kanagawa, and Hyogo prefectures. At the present time the older mechanical methods of soldering the flat metal wire edgewise on a base of the same metal, usually copper, brass, or silver, is still used. The various parts of the design are then filled in with layer after layer of the enamel of the desired colors, baking after each application. The surface of the final product is then rubbed down and polished. More recently the enamel is replaced with special lacquers or resins, so that the manufacturing process is much simplified and shortened.

Paper manufacture in Japan is a very old industry. The "Nihonshoki," one of the oldest Japanese histories, A. D., 720, states that a Korean Buddhist priest came to Japan in 611 and engaged in the manufacture of paper and Indian ink. This is the traditional beginning of the industry and occurred in the reign of the Empress Suiko (593 to 628 A. D.) During this reign Prince Regent Shotoku made paper

Production Statistics of the Japanese "Paper League"

(*In thousands of pounds*)

Year	*Superior printing*	*Ordinary printing*	*Newsprint*	*Torinoko*	*Wrapping paper*	*Sundries*	*Total, including all others*
1927	158,094	133,774	488,756	79,314	55,848	147,632	1,151,515
1928	190,253	150,491	515,161	104,736	83,323	157,545	1,305,750
1929	188,707	138,923	512,462	.....	89,839	154,359	1,302,739

These figures cover only about 90 per cent. of the production of the foreign style papers, made by the members of the Paper League. They do not include the native papers made by domestic industries. The figures for 1929 cover only eleven months, January to November, inclusive.

from the bark of the mulberry tree, the leaves of which were used to feed the silk worms. Cultivation of a special variety of mulberry for paper dates from this time and mulberry paper is still made on a small scale, particularly for paper threads used in weaving hats, such as the "Toya panama," clothing, etc. Very tough papers from the fibers of certain shrubs, such as mitsumata and kozo, also dates from antiquity. As a rule, native papers are practically always made in the home plants. In 1925, 30,190 of these plants manufactured native style papers with a production valued at 53,010,299 yen.

Manufacture of "foreign style" papers in Japan dates from about 1874 at a small mill in Tokyo. Now, a number of large paper mills are owned by the Oji, Fuji, Mitsubishi, Karafuto, and Kogyo companies. Some of these plants also manufacture printing and packing papers, cardboards, etc., and in spite of the depression, these have been able to keep up production very well, owing to the gradually increasing demand. This demand for papers in Japan and China covers a far wider field than in the western countries for the reason that paper is used instead of glass for most windows and doors, in many religious and other ceremonies, at funerals, weddings, for fireworks, etc. Some Japanese papers are exported to China, Straits Settlements, the United States, and a few other countries while a few special quality papers are imported from Sweden, Germany, the United States, etc.

The 1925 production of foreign style paper was 119,724,967 yen and the 1928 production of both native and foreign style papers was valued at 182,309,382 yen. The exports of paper in 1929 were valued at 26,288,000 yen. The leading Japanese paper manufacturers have formed a "Paper League" which controls about ninety per cent of the total output. This group produced 1,305,750,000 pounds in 1928 and 1,302,739,000 pounds in 1929.

Japanese Paper Imports
(*In 1000 yen*)

Source	*1929*	*1928*
England	1,712	2,276
Germany	818	1,039
Switzerland	....	37
Holland	164	307
Sweden	654	1,103
Norway	57	371
United States	163	268
Others	92	122
Totals	3,660	5,523

Paper Pulp Imports
(*In 1000 yen*)

Source	*1929*	*1928*
England	982	282
Germany	722	288
Sweden	1,482	1,157
Norway	3,287	1,518
United States	2,318	1,290
Canada	4,626	6,251
Others	368	670
Totals	13,785	11,456

Japanese Paper Exports
(*In 1000 yen*)

Country	*1929*	*1928*
China	16,398	15,891
Manchuria	4,061	3,841
Hongkong	1,742	1,774
British India	882	584
Straits Settlements	89	171
Dutch East Indies	114	82
Asiatic Russia	312	419
Philippine Islands	223	340
England	542	528
United States	1,072	1,321
Germany	321	213
Others	530	509
Totals	26,286	25,673

The financial position of several of the Japanese companies are considered typical of the industry. That of the Oji Mill for 1928 and 1929 is given below. This mill has a nominal capital of 65,916,650 yen (about $32,958,325.00) and a paid-up capital of 48,683,000 yen (about $24,341,500.00).

	1st Half 1928	*2nd Half 1928*	*1st Half 1929*	*2nd Half 1929*
Profits (in 1000 yen)	5,781	5,772	5,773	5,773
Ratio of profit, per cent.	2.37	2.37	2.37	2.37
Dividend, per cent.	1.50	1.50	1.50	1.50

The Fuji Mill has a nominal capital of 77,700,000 yen (about $38,850,000.00) of which 58,925,000 yen (about $29,462,500.00) is paid up.

	1st Half 1928	*2nd Half 1928*	*1st Half 1929*	*2nd Half 1929*
Profit (in 1000 yen)	5,251	5,286	5,287	4,566
Ratio of profit, per cent.	1.78	1.79	1.79	1.55
Dividend, per cent.	1.20	1.20	1.20	1.00

Capitalization and Production of Paper Companies

Name	*Paid-up Capital (in Million yen)*	*Production (in thousand pounds)*	*Percentage*
Fuji	58.9	524,577	35.
Oji	48.9	414,553	28.
Karafuto	48.2	274,682	19.
Mitsubishi Paper	8.0	86,664	6.
Hokuetsu	4.0	45,093	3.
Nippon Paper	9.5	29,318	2.
Inni	0.2	21,639	1.
Nippon Manufacturing	1.4	15,304	1.
Nishino	0.8	6,358	..
Totals	179.9	1,418,188	100.

Paper Specialties

The manufacture of paper specialties, such as card boxes, fancy packing papers, labels, paper napkins and handkerchiefs, paper "Toyo Panama" hats, clothing, etc., dates from about 1911, when the Nippon Kogyo Co. of Tokyo started production. Exclusive of the hats and clothing, the 1928 production was valued at 2,878,726 yen and the 1929 production at 2,940,226 yen. The "Toyo Panama" hats

and the clothing are made from special mulberry paper and at one time the hats alone reached an annual value of about 5,000,000 yen but this has now decreased to less than 3,000,000 yen. The paper handkerchief, which very much resembles a strong and absorbent paper napkin, is almost universally used in Japan. They are very convenient and satisfactory, and could find a much wider use in other countries, especially by travelers. Copying papers are also produced in quantity in Japan.

Wood Pulp

The leading Japanese producers of wood pulp are the Karafuto Kogyo, Fuji, and Oji paper manufacturing companies. These have plants at Karafuto, Hokkaido, and in Korea. The pulp production in 1928 was 718,997 tons and in 1929, 626,622 tons, which is sufficient to meet the local demands. With the decreasing supply of suitable wood in the more convenient districts, manufacturers have found it necessary to locate mills further north. Japan is now producing a very large amount of rayon by the viscose process and this is all made from wood pulp. The rayon is mostly of third or lower grade, as compared to the American and the best European products, and at least one American producer is making a serious effort to introduce cotton linters.

Sugar

The sugar industry is usually divided into two parts, that of Japan proper, and that of Formosa, but Korea also produces a little sugar. Formosa produces only cane sugar and Korea only beet sugar. Production in Japan proper is practically all from cane but experiments are still in progress on beet sugar production. The first beet sugar experiments were made by the Colonial Government in 1879, and in 1888 a private company again conducted experiments but without success. The two firms now interested in beet sugar are located in the Kitami Tokachi districts but their results have not been particularly successful. Sugar ranks next to cotton yarn in the list of Japanese exports and the exports in 1929 were valued at 29,974,000 yen. China and Manchuria formed the main export markets but at present the Chinese market is practically closed on account of the Manchurian trouble.

The production of raw sugar in Japan proper is insufficient to meet the demand so that it is imported from both Formosa and Java. The production of sugar in Formosa reached the maximum in the 1928-1929 season with 15,529,700 pounds. On account of this heavy production, both prices and profits were low. The official estimate for the 1929-30 crop was 17,733,000 pounds but the actual figures are not available as yet.

Japanese Sugar Supply and Demand

(In 1000 piculs of 133⅓ pounds each)

Supply	*1928*	*1927*	*1926*
On hand Jan. 1	1,560	1,459	650
Production (Japan)	1,960	1,568	1,607
Imported	6,350	7,021	7,568
Imported (Formosa)	9,734	7,029	7,442
Total available	19,604	17,077	17,267
Demand			
For export	3,797	2,442	3,063
Exported (Japanese)	215	119	195
Consumed in Japan	14,981	12,957	12,557
Total	18,993	15,518	15,815
Stock carried over	674	1,560	1,459

Japanese Sugar Companies

Name	*Number of Plants*	*Paid up Capital, yen*
Taiwan	13	38,100,000
Ensuiko	6	34,875,000
Dai Nippon	6	34,749,000
Meiji	7	34,800,000
Niitaka	3	10,750,000
Teikoku	5	13,500,000
Shinchiku	1	1,926,000
Showa	3	3,000,000
Saraku	1	675,000
Taito	2	1,750,000
Shinko	1	1,200,000

The combined balance sheet of the first six companies above, the Taiwan, Ensuiko, Dai Nippon, Meiji, Niitaka and Teikoku companies, for 1929 is as follows:

Financial Statement

	1st Half 1929	*2nd Half 1929*
Paid up Capital	166,774,000	166,774,000
Profit	10,017,000	13,341,000
Percentage of profit	12.0%	16.0%
Dividend rate	7.8%	7.9%

During the season October, 1927 to September, 1928, 27,550 chobu (67,497 acres) were in sugar cane in Japan proper, yielding 1,588,190 piculs (211,758,700 pounds) of sugar, worth 9,267,977 yen ($4,633,988.00). In Formosa, 106,721.7 chobu (261,468 acres) were in cane, and in Korea 625 chobu (1,531 acres) were in beets in 1930.

It is claimed that the sugar industry in Formosa is greatly handicapped by the lower wages and higher yields of the Javanese producers. Due to the greater fertility of the Javanese soils, better handling, irrigation, etc., they give almost three times the yield of both cane and centrifugal sugar. The wages in Formosa are about forty sen ($0.12 U. S.) per day, as compared with about twenty-four sen ($0.072 U. S.) in Java, and several dollars in the United States. Formosa has a protective tariff of 3.95 yen per picul (about $1.185 per 133 pounds) on sugar but the domestic producers claim that this in insufficient.

Developments During Depression in Chemical Field

A resume of the developments during the past year which promise to affect the course of American chemical business in the future.

OPERATING on production schedules about 50 per cent. of the average output of the five years, 1924-29, the American chemical companies have spent the past year chiefly in a struggle to bring costs in line with the values of today and battling each for their share of the reduced volume of business.

Financially, it has been a period of continued deflation, of writing down investments, of writing off dubious assets. From the industrial point of view, the year has been characterized by curtailed operations with constant plant research and experiment to lower costs, efforts that in a number of important instances have been unexpectedly successful. Commerically, there has been a distinct trend towards new products, especially to specialties, and a good deal of overhauling of sales plans and policies. Technologically, research has been pared less than might be expected, but it has naturally been focused upon practical problems, and though few important new developments have been brought on to the commercial stage, still many have been carefully planned and await only a return of confidence in the business future.

Strengthened Positions

In a word, American chemical industry has retrenched and consolidated its position. In spite of some heavy drafts upon reserves and a number of minor casualties, the frontline is holding firm. Not only has the industry stood the punishment of the past three years better than many others, but it is quite generally conceded to be the one industry which will recover earliest and advance furthest during the next ten years.

Indicative of this vitality, several important new enterprises have been launched into successful commercial operation. American potash independence, for example, begins to assume more realistic form with the successful tapping of the beds in New Mexico by the United States Potash Company, and the preliminary tests not only of the New Mexico Potash and Chemical Company, but also of the Texas Potash Company in western Texas, near Odessa and Midland. Furthermore, another sulfur source has been opened up near Abbeville, La. by the Jefferson Lake Oil Company, which came into production early this autumn.

Last September the du Ponts placed on the market a new product, urea-ammonia, in liquid form, which they are shipping in tank cars. The material, which consists of two-thirds ammonia and one-third urea by weight, contains 46 per cent. nitrogen, and obviously holds possibilities in the fertilizer field where higher test materials are continually growing in favor.

Although strictly a new development of 1931, the du Pont rubber substitute, duprene (nono-vinyl-acetylene, from acetylene, treated with HCl, to chloroprene and by controlled polymerization to duprene) has been finding itself. It does well, as has been jokingly said, whatever rubber does badly. It does not oxidize easily, nor swell in contact with gasoline, lubricating oils, or ordinary solvents. These qualities are winning it uses for making gaskets, packings for diaphragm pumps, and rubberized cloth. It is a material that is evidently destined to mark a real advance in the field of rubber synthesis, especially as it can be produced in latex form by vulcanization with heat alone, reducing to a fine powder and suspending it in water.

After three years experimental work, during which a number of difficulties in large-scale hydrogenation have been successfully solved, the Bayway plant built by the Standard Oil of New Jersey, under their agreement with the I. G. on the Bergius patents, is also apparently coming into its own. For the past eighteen months it has been turning out kerosene; this last summer a lubricating oil, trade-named "Essolube," for which marked advantages are claimed, came on the market, and there is also now a sizable production of the so-called fireproof gasoline, distinguished by a very narrow boiling range and a high flash point, for which the aviation engineers have long been

waiting. This whole hydrogenation development has been checked badly by the current over-production and subsequent low price of gasoline. When balanced against the considerable costs of installation, this has cancelled the economic advantages of increased yield—and better quality claimed for hydrogenation. As a result, the only avenue open for the new process was the perfection of special products, and it is understood that in addition to those mentioned there will be several new, or at least improved, hydrocarbon solvents forthcoming during the coming twelve months.

Patents and patent litigation have been to the forefront during the past year. There is growing dissatisfaction with the patent law, the administration of the Patent Office, and the increasing emphasis placed in the courts upon technicalities. The feeling grows that the present patent situation is one that makes it increasingly difficult to secure the rights supposed to accrue with the disclosures of invention. As yet, there is very little unanimity of thought as to what reforms are necessary, nevertheless, there is increasing agitation which will sooner or later result in changes in the patent laws of the country.

Patents and Trade Names

During the year, the Wiseman Patent for the fermentation of corn to butyl alcohol has been twice upheld in the suits of the Commercial Solvents against the Union Solvents Corporation. The du Pont low viscosity lacquer patent has not been upheld and if this decision should be sustained in the higher court, the lacquer patent tangle will not be cut, but will have to unravel itself in the course of time. On the other hand, although the courts upheld that the vanadium patents, controlled now by the American Cyanamid Company, do not infringe the original Badische catalyst patents, controlled by the General Chemical Company, still the decision upholds the patents, and the vanadium catalyst process, which is of increasing importance in the industry, is not thrown open to general use. An important definition of contributory infringement was rendered by the Supreme Court in the dry ice case, in which it was held that the buyer of the patented containers for solid CO_2 did not infringe if he sold the containers packed with dry ice manufactured by another company.

Furthermore, the Dry Ice Corporation was not sustained in their contention in the suit against the Louisiana Dry Ice Company that the words "Dry Ice" were a patented trade-mark name. The court held that the words were descriptive and not patentable, but, on the other hand, such proprietary rights were held for the words "Ethyl Gas."

One outcome of the thoroughly unsatisfactory patent situation, arising out of conflicting or interferring patent claims, has been the effort by negotiation to solve this problem out of court, although the du Pont proposal to stabilize conditions in the lacquer industry by licensing under their low viscosity patent has met a distinct check. Nevertheless, progress has been made along this same line in other directions. Petroleum Distillation, Inc. has been organized to pool the distillation patents controlled by the Atlantic Refining Company, the Standard Oil Companies of Indiana and New Jersey, and the Foster-Wheeler Corp.

Merging Patent Rights

In this connection the patent alliance of the Standard Oil of New Jersey, the National Distillers Products Corporation, and the Barnsdall interests in the recently organized Standard Alcohol Corporation, will operate the Oklahoma plant of the Petroleum Chemical Corporation that was the successor to the ill-fated operation undertaken several years ago at Tiverton, R. I. for the production of isopropyl alcohol. Although the lacquer makers are eager to try out any new solvent available in constant supply of the large quantities they are accustomed to demand, this intriguing solvent has consistently failed to live up to expectations, and the difficulties of the propyl group are possibly the basis of persistent rumors to the effect that the new company will eventually produce ethyl alcohol from natural gas. This is not an unlikely development, though it is pointed out that the present plant would have to be entirely revamped for this purpose. The example of the Union Carbide synthetic alcohol plant in West Virginia, working directly with ethylene, is encouraging. Last year's production was said to have been six million gallons, produced at a satisfactory cost despite the low price of alcohol. From the new Shell Oil enterprises on the West Coast are now coming regular supplies of secondary amyl and butyl alcohols, and methyl ethyl and methyl propyl ketones. The amyl alcohol operation of the Sharples Solvents Corporation is being moved from West Virginia, to near Detroit, Michigan, closer to the consuming industries, though an advantageous contact with the Pennsylvania Salt Company, both for land near their Wyandotte plant and for alkali supplies, was doubtless the determining factor in the transfer.

At Petrolia, Pennsylvania, a commercial installation has been made of a new sulfuric acid recovery process that possesses enormous possibilities, which may upset very greatly the existing economics of this most important of the acids. The petroleum industry consumes annually over 600,000 tons of sulfuric acid; the new process theoretically recovers not only the acid in the sludge but removes and converts to acid the sulfur in the crude oil, with the result that there is a theoretical recovery of 105 per cent. Such an operation, if successful, would transform one of the big sulfuric acid consumers into the producer of a salable surplus. Problems of heat transfer and the economics of water evaporation are still to be worked

out before this new process demonstrates its practicability, nevertheless, it is potentially one of those rare technological developments that seriously affect the chemical balance of supply and demand.

Another pilot plant of very great economic interest is Dr. Herty's experiment in paper making from southern slash pine. Here the interest is less chemical, less industrial even, than the possibilities held in giving the southern states of the coastal plain a new agricultural crop to help take the place of the cotton. Slash pine can be grown to cutting size for pulp making in ten years, and certainly the market exists for a new source of newsprint paper pulp.

Concentrating Activity

The most notable outward sign of the inward reorganization which many of the chemical corporations have been going through during 1932, is the concentration of most of the sales of merged companies in the American Cyanamid group into a single company. Several famous names in American chemical history—Kalbfleisch, A. Klipstein, Selden—are now submerged in the American Cyanamid and Chemical Corporation. Many other companies in a number of different ways have been endeavoring to simplify their sales organizations and cut down materially the costs of distribution which have grown greatly in the United States during the past two decades and which are today admittedly out of line with the costs of production. Against the current of concentration, the Swann Corporation has had the courage to expand their sales efforts and cover the eastern and southern industrial regions with their own salesmen. With the tide there have been several plans for a uniting of sales efforts among different groups of non-competing manufacturers and for consolidations of various jobbing distributors. These plans, doubtless, await better business conditions, but they indicate what is well recognized to be one of the real problems to be solved.

Another is the problem of technological unemployment. While not as great a contributor to this problem as the machine has been, nevertheless, chemicals, chiefly by saving time in manufacturing operations, or by the substitution of manufactured for natural raw materials, have had their share in replacing labor. The ideal chemical operation is obviously one which is continuous and automatic, working twenty-four hours a day with the minimum of hand labor. And there is no doubt but that even the application of present known tested processes could very materially reduce, not only the number of technical but manual laborers in plants. However, as the exhaustive report of the American Institute of Chemical Engineers has shown, chemical processes have been a very potent contributor to the creation of new industries and, in view of the imperfect data, it is difficult yet to say on which side of the labor balance the efforts of chemistry finally rest.

Of foreign commercial developments, directly affecting the chemical industry, none has aroused so much attention as the Ottawa Conference, the Tariff and Trade agreement notably between Canada and Great Britain, which promises to cut off ten per cent. of American Chemical business in the Dominion of Canada. Our exports to that country of chemicals, were for the year 1927, $26,834,000; for 1929, $31,860,000; for 1931, $34,252,000; which would mean if the objectives of the Ottawa Conference are reached, a net loss of chemical export to the United States of about $3,000,000 per annum. This is a rather important item, although there was a marked increase in chemical exports since the pre-war period. The United States is, at the present time, only sending abroad four per cent. of its manufactured chemical output. During 1932, as during the year previous, American chemical exports have had a remarkably continued rise in excess of our imports, a condition which, except under war years, has never obtained. Conflicting explanations are given of this curious commercial phenomena.

The increase in foreign business has come chiefly in finished chemicals, in fact, based on the present curtailed volume of trade, the United States has lost some ground in phosphate rock, naval stores, and sulfur, for which the country is recognized as world headquarters. The favorable balance of our chemical exports is doubtless due to the surplus of manufactured material due to a larger scale of operation, as is the case in a number of the standard items undoubtedly below the average of world cost.

The opening of the new year finds the chemical industry marking time. So long as the general industrial activity of all industry is curtailed, chemical consumption will not increase. But the American chemical industry faces the future with confidence, certain that in the rehabilitation of manufacturing activities, chemicals and chemical processes are going to play a larger part than ever before. In the field of plastics (including lacquers, dopes, moulded goods, and rayons), in the chemical development of crude petroleum as a source of raw material for chemical operations, in the expansion of their processes among fabricating industries, and in the continuous substitution of chemical products for natural raw materials, there is bound to be a greater chemical business than ever in the past.

Tunisian Phosphate

Tunisian phosphate exports during the first eight months of 1932 totaled 1,010,000 metric tons as compared with 1,262,000 in the corresponding months of 1931. Production during June and July of 1932 was somewhat less than exports but the position was reversed in August. The excess in production over exports totaled 103,000 tons for the first eight months of 1932 as compared with 273,000 tons for the eight-month period of 1931.

The British Chemical Industry in 1932

By M. D. Gurwen
Editor, "The Industrial Chemist" (London)

DURING the past year the political and economic movements that have taken place have somewhat overshadowed all other problems. Chemists and other scientific workers who hitherto actually eschewed or pretended to eschew political subjects have found themselves to be normal citizens and have earnestly discussed the new British tariff problem, the Gold Standard, the Ottawa Agreement and the American Debt.

Whether it be the low value of sterling or the result of the adoption of tariffs or a combination of both, one important fact is outstanding. The balance of British trade has certainly improved, that is imports of foreign-made goods have greatly decreased. Against this however we must set the diminished income derived from British shipping which, as is the case with other nations, is in a parlous condition. Dealing with the chemical trade alone there is considerable satisfaction to be gained from reading the import and export figures given below. There is a great drop in imports compared with 1931 while in the export trade there has actually been a slight increase. This, in a year of lamentable depression will be considered a good augury for the future of the industry. Sir Harry McGowan, the Chairman of Imperial Chemical Industries, in a recent speech, commented on the strength of the British chemical industry and stated that he was convinced of the return to prosperity in the near future.

Imports for 11 Months ending November 30

Value in Pounds Sterling

Commodity	*1931*	*1932*	*Decrease or Increase*
Acetic acid and anhydride	314,300	303,300	— 11,000
Tartaric acid and salts	227,500	64,300	— 163,200
Borax	119,700	82,900	— 36,800
Carbide	504,100	448,700	— 55,400
Red Lead	48,100	28,300	— 19,800
Potassium compounds	1,123,100	1,096,800	— 26,300
Sodium compounds	912,600	267,700	— 644,900
Finished dyestuffs	1,139,400	877,000	— 262,400
Extracts for dyeing	145,000	107,000	— 38,000
" " tanning	888,700	706,700	— 182,000
Drugs, medicines, etc	1,712,500	1,111,000	— 601,500
Painters Colors, etc	1,495,200	1,133,400	— 361,800
Total	12,657,000	8,703,000	— 3,954,000

The imposition of tariffs has resulted in the installation of some 120 foreign manufacturing concerns which it is stated will eventually absorb some 14,000 workers. This number while small and one scarcely calculated to affect greatly the unemployment problem, is an indication of the value of Great Britain as a market. This country, without doubt is still the market hub of Europe and very recent events have proved Great Britain's inherent stability.

Exports for 11 Months ending November 30

Value in Pounds Sterling

Commodity	*1931*	*1932*	*Decrease or Increase*
Sulfuric acid	22,200	31,900	+ 9,700
Tartaric acid and salts	49,200	41,700	— 7,500
Ammonium sulfate	2,376,100	1,894,700	— 481,400
Bleaching powder	121,600	162,900	+ 41,300
Coal-tar products	565,500	640,800	+ 75,300
Copper sulfate	676,500	751,100	+ 74,600
Disinfectants	761,800	713,700	— 48,100
Glycerine	213,600	278,500	+ 64,900
Potassium compounds	154,100	147,200	— 6,900
Sodium compounds	2,633,200	2,991,200	+ 358,000
Dyes	1,008,000	1,071,200	+ 63,000
Painters colors, etc	2,195,700	2,021,200	— 174,500
Drugs, medicines	2,449,200	2,418,400	— 30,800
Total*	15,720,800	15,899,500	+ 178,700

*It will be obvious that certain chemicals included in the totals have not been shown in detail, and consequently the totals do not correspond to the sums of the figures.

The Ottawa Agreement

Despite considerable criticism on the part of many Liberal and other politicians, satisfaction regarding the signing of the Ottawa Agreement is general and the greater number of British people believe that in Empire Free Trade there are possibilities of markets just as important to us as foreign ones. Certainly, under a general Free Trade system we had the ridiculous anomaly of foreign countries exporting to Great Britain and not only buying practically nothing in return but buying most of what they needed from other countries. One important result has been that many foreign countries are now very anxious to conclude trade agreements with Great Britain.

Regarding the Dominions of the British Empire and chemical trade, there is every hope that interesting developments will result from the agreement. There are obvious difficulties to be overcome, for competitive manufacture in both Dominions and in Great Britain are obvious problems but the greatest hope lies in proper co-ordination. Thereby it is hoped that redundant and uneconomic industries bolstered up by State aid will be eliminated. Reasonable agreement regarding effective preference has also been reached. By such preference it is hoped that Great Britain will have some considerable share in the chemical trade of the Dominions. For example, it is hoped to increase our trade with Canada, a Dominion which imports far greater quantities of chemicals from the United States than it does from Great Britain. Recent figures show how big is the discrepancy, the total chemical imports from U. S. A. being over 20 million dollars while those from the United Kingdom being only four million dollars.

General

After a comparatively poor year which included a Cotton Strike and a rise in the price of petrol which as will be noted later affects dyestuffs manufacturers, the end of the year seems full of promise. The outstanding business during the last month or two has been the increasing number of inquiries from overseas markets not only from Colonies and Dominions, as a result of the Ottawa Agreement but also from foreign countries attracted by the fall in sterling. Fertilizers, in particular ammonium sulfate, have been in great demand for export in the last month or so. A large number of chemicals particularly those for the synthetic resin industry, e. g., formaldehyde and carbolic acid, have been in demand throughout the year and have brought high prices.

Of important events has been further rationalization by the fusion of British Alizarine Co., and Emco Dyestuffs into Imperial Chemical Industries Ltd. The position of the dyestuffs industry in which this company is so much concerned is at present remarkably strong. During the past year there has been a steady recovery from the slump of 1930. The dyestuffs industry supplies over 90% of the needs of the country and, as will be seen from the figures in the above table, exports have increased satisfactorily. The Dyestuffs (Import Regulation) Act is to be continued for yet another year, but the opposition to its continuance has been strengthened. The color users have issued a special minority report included in the Dyestuffs Industry Development Committee's Report urging the lapse of the Act, and submitting that the industry is strong enough to stand alone and that costs of dyestuffs have increased because of the protection given to the industry. The dyestuffs manufacturers submit that last year's prices were uneconomic and that in certain respects they are at a disadvantage when compared with foreign manufacturers. This is certainly true in one respect at least, namely, the price the British manufacturer has to pay for benzol, toluol and xylol. As benzol is an important motor fuel the price varies with the price of petrol, with the result that pure "benzole" is about 32 cents per gallon f.o.r. works. As some 4,000,000 gallons are used yearly by the dyestuffs manufacturers it will be seen that it is highly desirable that a new method of taxation of motor fuels be introduced.

New Construction and Developments

The Mond Nickel Co.'s works at Clydach in South Wales have undergone considerable reconstruction and the new copper sulfate plant, stated to be the largest in the world is now complete.

At least three "dry-ice" plants are now working in the country and distributing solid carbon dioxide. Imperial Chemical Industries Ltd. as stated last year employ the "Carba" process, while Solvent Products Ltd. of Dagenham, Essex, utilize the "Esselinger" process, purifying the carbon dioxide obtained from their molasses fermenters.

Pharmaceutical chemists will be interested to hear of the completed construction this year of the new Boots' factory at Beeston near Nottingham. It is stated to be the most up-to-date factory of its kind and is made "entirely" of glass, or at least so it appears from an exterior viewpoint. The factory is certainly efficiently built and is constructed on the uni-directional flow system.

The well-known firm of Chemical & Metallurgical Corporation Ltd., which was reconstructed a few years ago, progresses favorably and has now undertaken the manufacture of gelatine. Another interesting development is the production of citric acid by fermentation methods. An economic process has been worked out by Messrs. Rowntree of chocolate fame and the method is being carried out in close conjunction with this firm by Messrs. J. & E. Sturge, who are well-known producers of this organic acid.

As has been recorded previously several foreign firms have opened new factories in this country; most of these are connected with the "lighter" industries. Messrs. Coty have built a works, a model of its kind, for the production of scents. Imported materials are mainly used and are blended and packed here. A German firm has installed an "eau de Cologne" works and the construction of a works producing vitamin-containing compounds and a soluble aspirin is also announced.

Our British photographic industry has made a remarkable stride forward in the production of infra-red plates and filters. Although the use of infra-red sensitive plates is by no means new, the difficulties inherent in such plates, hitherto, prevented their general use. Messrs. Ilford Ltd. however, by the discovery of a new infra-red sensitive dyestuff (a carbo cyanine) are now able, for the first time in the

history of photography, to place on the market a plate which enables photographs to be taken with ordinary exposures. Remarkable photographs taken under misty conditions with infra-red sensitive plates have been published in the press showing clear details of landscapes more than fifty miles away. Photographs with such plates showing mountains in Nevada, U. S. A., 220 miles away have also been made.

Of peculiar interest to both the textile and synthetic resin industry has been the introduction of the so-called "creaseless-cotton" by Messrs. Tootal, Broadhurst & Lee who, by introducing synthetic resin into cotton fibres, have made a very elastic material. Another interesting fabric, which was shown to the public for the first time at the British Industries Fair in 1932, was an artificial suede made by spraying waste wool on to rubber sheet.

Yet another interesting development among the "heavy" industries is decision on the part of Messrs. Stewart & Lloyd to commence the manufacture of steel by the basic Bessemer method. This process has not been employed for many years in this country, all requirements for this type of steel having been obtained from abroad. Now that the tariffs are in force and trials have proved that the Northamptonshire iron-ore deposits are quite suitable for the manufacture of basic Bessemer steel, the way for such manufacture here has been cleared. The scheme will involve the expenditure of some £3,000,000.

Chemical Engineering

There is very little to report regarding advances in chemical engineering, progress in which is necessarily very slow. As reported last year, possibly the most interesting has been the new type of heat exchanger, in form resembling a filter press, brought out by that very scientific firm Aluminum Plant & Vessel Co. It has been adopted in several branches of the chemical and allied industries with considerable success. The use of diphenyl as a heating medium is spreading, the pioneers in the fabrication of plant for this purpose being the Kestner Evaporating & Engineering Co. More latterly the Whessoe Foundry & Engineering Co. have constructed a spiral boiler for supplying heat to diphenyl compounds.

The highest class of chemical stoneware, namely the pure white variety has not been obtainable in this country although it was made here during the war. It was practically all obtained from Germany, but in the last half year both famous Doulton works and the Hathern Brick & Terra Cotta works are producing first class material. The white variety is especially advantageous for storing delicate material or for process work in precious metal refineries.

Imperial Chemical Industries Ltd. has enormously improved trichlorethylene plant they market for grease and oil removal from engineering parts and the like, and have now constructed a continuous type of machine. Messrs. Robert Jenkins of Rotherham appear to have considerable success with their new dryer which was originally employed for salt drying. It consists of a number of shelves (rather like the Herreshoff burner in principle) each shelf being in effect a centrifuge, the descending material being shot sideways and descending to the next shelf below.

The Industry's Bookshelf

Introduction To Business, by Clinton A. Reed and V. James Morgan, 529 p., published by Allyn and Bacon, 11 E 36 St., N. Y. City. $1.40.

Business executives are continually complaining that high school graduates and even college graduates very often have only the haziest notion of the complex make-up of the business world. This book is designed as a textbook for use in schools to help overcome this condition. It also will prove helpful to students wishing further information in order to aid them in picking out the type of work they are most fitted for.

Meet the Sciences, by William Marias Malishoff, 195 p., published by Williams & Wilkins Co., Baltimore, Md. $2.50.

A panoramic view of science by a scientist-philosopher-poet, surveying the highly developed field of human thought, and doing it, so to speak, democratically. He introduces the scientist, presents a round table of the sciences, and comments on the place of science in modern life.

The Principles of Financial and Statistical Mathematics, by Maxmilian Philip, 405 p., published by Prentice-Hall, Inc., 70 5th ave., N. Y. City. $3.50.

A book that completely fills a long-felt need for a book that would give practical application in business to the science of mathematics.

Alloys of Iron and Molybdenum, by J. L. Gregg, 507 p., published by McGraw-Hill Book Co., 330 W. 42 st., N. Y. City, $6.00.

A monograph prepared at the Battelle Memorial Institute. The purpose is to collect in readily usable form the important facts on molybdenum steels and the other alloys of molybdenum and iron, with or without additional alloying elements. Another important function is to point out the gaps in information, so that need for research to fill those gaps will be evident.

The Forms and Properties of Crystals, by A. B. Dale, 186 p., published by The MacMillan Co., 60 5th ave., N. Y. City. $1.60.

Designed as an inexpensive treatise on mineralogy and crystallography for first-year students.

Basic Business Barometers—Their Meaning And Use, by Wilfrid H. Hemingway, 209 p., published by Hemingway Institute, Mills Bldg., San Francisco, Cal. $5.00.

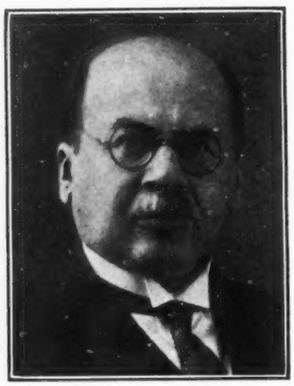
A detailed explanation and discussion of the more important business barometers of particular value to manufacturers, retailers, bankers, credit managers, statisticians, accountants, investors, writers and to all who are called upon to interpret business conditions.

Elements of Mining, by George J. Young, 707 p., published by McGraw-Hill Book Co., 330 W. 42 st., N. Y. City. $6.00.

A very comprehensive and exhaustive textbook designed to give the student of mining a starting point upon which he can build his reading and experience. The third edition has been revised and enlarged. All of the worthwhile advances made in the past ten years have been included.

Medical Care For The American People, 213 p., published by University of Chicago Press, Chicago, Ill. $1.50.

The final report of the Committee on the Costs of Medical Care organized in 1927 and its recommendations based upon the findings of five year's intensive investigation.



German Review of the Year 1932

By Dr. Walter Roth
Editor, "Chemiker-Zeitung," (Kothen)

GERMANY, in 1932, was in the sign of her great poet and thinker Goethe, the 100th anniversary of his death falling on March 22nd, 1932. Only recently have Goethe's relations to chemistry become better known and appreciated. One wonders how fully Goethe, also in this respect far ahead of his time, had recognized the value and importance of chemistry in human life, how he furthered the instruction in chemistry at the University of Jena, always showing a genuine interest even in specific details of chemical reactions. It is his correspondence with Döbereiner which furnished much elucidation on the above.

Chemistry lost one of its greatest with the passing away of Wilhelm Ostwald (1853-1932), known the world over as a natural philosopher and organizer, and in whose institute in Leipzig many of the leading physico-chemists of today received their final tuition. Carl von Linde, founder of modern refrigeration and the industrial liquefaction of gases, which branches of the industry have attained an importance never expected, celebrated his 90th birthday, June 11, 1932. It is also worth mentioning that on May 7th, despite the general state of distress, the new library of the German Museum at Munich was inaugurated, in celebration of the 77th birthday of its founder Oskar von Miller.

Want and suffering are great in Germany. Particularly hard hit are the scientific and research institutes, although far-sighted scientists and leaders in economics repeatedly have sounded warnings that just in times of distress, research and science are so much the more and urgently needed. Hardest hit have been "Notgemeinschaft der Deutschen Wissenschaft" and "Kaiser-Wilhelm-Gesellschaft zur Förderung der Wissenschaften," in whose institutes scientists like Haber, O. Hahn, C. Neuberg, Warburg, to name but a few, do their work. With a view to relieving suffering among the younger chemists, efforts are being made to create a voluntary relief committee to secure occupation for unemployed young chemists on research work, planned by investigators or institutes. Such help is engaged through the intervention of "Ingenieurdienst" at a pay of R M 2. per day, so that in performing such research work the young chemist is given the opportunity to continue in his profession. Suffering is particularly severe among Germany's chemists. There are in excess of 11,000 chemists, of which about 1500 experienced chemists and a like number of beginners are unemployed. This means nothing more than that the prospects for young chemists in Germany are at present decidedly poor. During the next few years the chemical industry will be able to absorb only 250-300 young chemist graduates, whereas twice as many will become available. Other academical professions are not any better off in Germany at present, but, in view of the fact that chemistry is one of the most expensive studies, only those ought to make chemistry their choice who have a genuine reason to do so and feel a particular urge or suitability for this profession.

The chemical industry of Germany, which, during times of greatest distress, has shown a relatively great power of resistance and has always understood how to adapt itself to the prevailing conditions, has for the first time in years, increased its number of employees, in contrast to the usual seasonal reduction, as may be gathered from the following table.

Number of workmen and employees of the chemical industry:

1928	356,800	May, 1932	250,000
1929	356,300	July, 1932	237,000
1930	307,300	August, 1932	237,000
1931	259,100	September, 1932	238,000
January, 1932	238,000	October, 1932	*244,000
March, 1932	240,000	November, 1932	245,000

*Preliminary estimates.

More than in any other branch of industry, reduced working time was adopted in the chemical industry, but despite this, more laborers and employees were taken on during the autumn than were required to fill the openings created by the curtailment of the working hours per week. The I. G. Farbenindustrie A.G. for instance, has, according to a communication, increased its staff by 4,000 men in excess of the number of men called for by its job sharing program based on the possibilities created by the reduction in taxes

offered by the government for this purpose. It must not be overlooked that Germany's chemical industry depends in first line on export and cannot exist without it. Of course her chemical industry serves also her agriculture, thus satisfying also an internal demand, but the overzealous endeavors for anarchy as they have come to the surface in Germany, must be, and also were, opposed successfully by the chemical industry.

Of great interest are the suggestions offered by Dr. Karl Bosch, managing director of I. G. Farbenindustrie A. G., for the solution of Germany's farm relief problem, which are published under "Handelspolitische Notwendigkeiten," in *Berliner-Borsenzeitung* of November 13. In this article he suggests a reduction of the spread between production cost and sale price of agricultural produce, also, the formation of cartels controlling their distribution, after the manner of cartels which control the distribution of industrial products.

According to data supplied by *Vereins zur Wahrung der Interessen der Chemischen Industrie Deutschlands*, German export in chemicals from January to October 1932, was the following in 1000 R. M.:

	Export	*Import*
Heavy Chemicals	142,802	23,725
Wood Distillation Products	6,954	1,807
Nitrogene Fertilizers	62,422	9,527
Phosphorous Fertilizers	2,298	6,191
Coal-tar Dyestuffs and Intermediates	108,425	12,788
Pigment—Colors and Coloring Materials	49,458	5,720
Enamels, Lacquers and Putties	9,440	628
Explosives, Powders and Priming Mixtures	10,767	163
Pharmaceutical Products	85,163	8,528
Essential Oils and Perfumes	9,905	12,892
Cosmetics	5,575	1,136
Glues and Gelatines	7,900	1,399
Tannins	1,827	9,484
Artificial Silk (Rayon)	24,451	37,159
Carving and Moulding Materials	12,245	2,291
Photographic Chemicals	31,694	3,469
Various Chemical Products	27,903	1,994
Total	599,229	138,891

It is of great interest to note the changes that have occurred during 1932 regarding the trend of chemical export. Whereas 80 per cent. of Germany's total exports are absorbed by the European market, only slightly more than 60 per cent. of her export in chemicals remains in Europe, slightly less than 40 per cent. going abroad. In the first half of 1932, France became Germany's best customer, taking the place Great Britain held previously. The Scandinavian countries are also good customers of Germany, and her export in chemicals to Switzerland, Italy, Spain, Austria, and Czechoslovakia show a fair degree of stability. Chemical exports to Russia have fallen off considerably, because that country has gradually become capable of satisfying its needs with home production. Total orders, including those for chemicals, placed by Russia in 1932 in Germany, amounted to 450 million R. M., against 900 million in 1931. Among Germany's overseas customers for chemicals, the United States still holds first place; exports to China and Japan have, however, fallen off considerably.

The following table gives accurate figures for the share of the German export in chemicals absorbed by the various countries*:

*From *Chemische Industrie*, 1932, 44, page 845.

	1929		*1931*		*First Half 1932*	
	Mill RM	*%*	*Mill RM*	*%*	*Mill RM*	*%*
Europe, total	864.0	60.8	612.1	61.3	238.5	63.2
Great Britain	90.5	6.4	82.3	8.2	24.5	6.5
France	71.4	5.0	39.1	3.9	32.2	8.5
Belgium-Luxemburg	51.3	3.6	39.4	4.0	12.3	3.2
Netherlands	115.1	8.1	66.6	6.7	21.1	5.6
Switzerland	65.2	4.6	44.9	4.5	19.6	5.2
Italy	53.7	3.8	34.7	3.5	13.1	3.5
Spain, Portugal	43.3	3.1	29.6	2.9	15.0	4.0
Austria	38.1	2.7	30.5	3.0	13.3	3.5
Czechoslovakia	63.0	4.4	48.1	4.8	18.0	4.8
Hungary	19.7	1.4	13.9	1.4	4.4	1.2
Jugoslavia	12.6	0.9	8.3	.8	3.1	.8
Rumania	15.3	1.1	11.2	1.1	4.4	1.2
Bulgaria	3.7	.3	3.1	.3	1.7	.5
Greece	8.5	.6	6.2	.6	1.4	.4
Scandin. Countries	104.1	7.3	87.4	8.8	43.3	9.1
Baltic States	25.4	1.9	18.7	1.0	6.5	1.7
Russia	48.7	3.4	23.8	2.4	4.9	1.3
Poland	26.1	1.8	14.7	1.5	5.1	1.4
Danzig	3.5	.2	2.7	.3	.9	.2
Saar Territory	4.2	.3	5.7	.6	2.3	.6
Oversea Export, total	556.0	39.2	386.3	38.7	139.0	36.8
U. S. A.	154.3	10.9	71.2	7.1	23.0	6.1
Canada	12.6	.9	8.7	.9	3.4	.9
South America	94.3	6.7	46.4	4.6	22.8	6.4
China	54.1	3.8	61.9	6.2	16.7	4.4
Japan	91.3	6.4	60.8	6.1	20.8	5.5
British India	42.1	3.0	42.0	4.2	19.5	5.2
Netherland Indies	23.3	1.6	19.9	2.0	5.5	1.5
Other Asiatic Countries	18.9	1.3	16.4	1.6	5.5	1.5
Africa	25.4	1.8	16.4	1.6	5.9	1.6
Australia	9.9	.7	7.5	.8	3.1	.8

Relative amounts of the various products constituting the total exports in chemicals have, during the first half of 1932, remained the same as during 1931, but towards the end of 1932, a revival in the export business as well as in the inland trade was manifest, indicating that the bottom of trade stagnation evidently has been reached. The Chamber of Industry and Commerce of Berlin, in its annual report for 1932, contains a favorable prognostication for the future, but emphasizes the necessity of abolishing first the numerous hindrances existing in Germany and other countries, which exert a retarding influence on the development of business activities. According to this report, these tensions which are of a purely financial and commercial political nature must first be eliminated. This would lead to the solution of many problems to be dealt with at the proposed World Economic Conference. Right now seems to be the psychological moment for such an undertaking.

Coordinations and agreements within the chemical industry have made progress during 1932, especially in the fertilizer, dyestuff and rayon industries. World-wide understandings have not, however, been reached. The 10 per cent. reduction of prices for manufactured articles, as decreed in 1931, was completed in the early part of 1932. The following table shows the decrease in the price index in the wholesale trade for the beginning and end of 1932, taking the index for 1931 as 100.

Index Groups	*Index-Number January 1932*	*Index-Number December 1932*
Agricultural Products	92.1	85.1
Industrial Raw Materials and Intermediates	92.2	87.3
Industrial Finished Products	125.2	113.7
Index of Total	100.0	92.7

Living costs were reduced from 124.5 in January 1932 to 118.8 in November 1932. Prices for imported raw materials and foodstuffs have fallen off more than the prices for exported industrial products, which explains the favorable trade balance of more than one billion R. M. Germany's imports, including November 1932, amounted to 4,236 million R. M., her exports to 5,248 million R. M., leaving a balance of 1,012 million R. M. in her favor. Taking, however, 1928

as the basis, the value of her imports would exceed substantially the value of her exports. With an intensification of business activity prices for raw materials will rise and this, in turn, will defer, to some extent, the revival of German export business. The total capital invested at present in the chemical industry of Germany is estimated at three and one-half billion R. M., of which 2.20 billion, i. e. about two-thirds is invested by large corporations. Smaller corporations own about 100 million R. M., the G.m. b. H. corporations about 600 million R. M., and private corporations about 400 million R. M. of the balance.

The following reductions of stock capital were carried through in the German chemical industry recently:

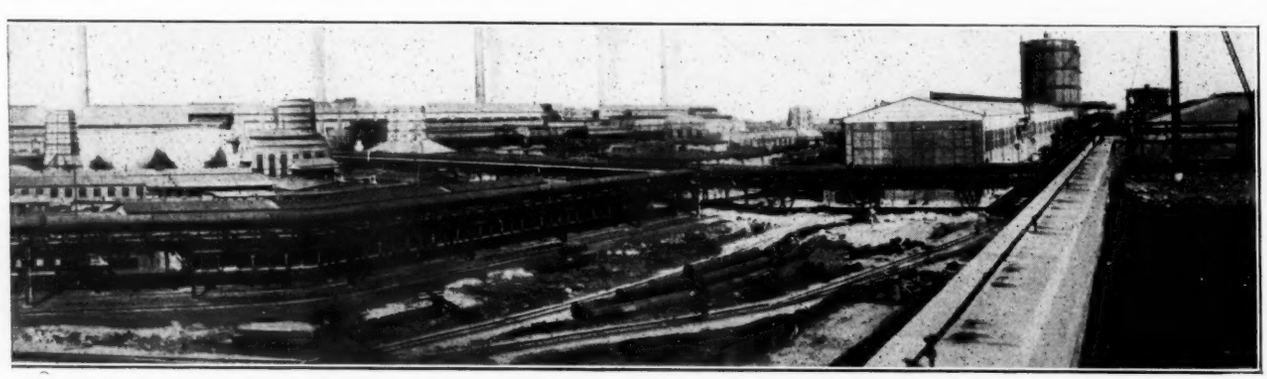
Name of Corporation	*Former Stock Capital Million RM*	*Reduced Stock Capital Million RM*	*Remarks*
I. G. Farbenindustrie	812.69	702.74	Buying back own stock.
Kokswerke u. Chem. Fabriken	80.00	48.00	Stock re-apportioned 5:3.
A. G. fur Pharmazeutische Bedarfsartikel Wenderoth	1.80	1.20	Buying back preferred stock, common re-apport. 5:4.
Chem. Werke Schuster & Wilhelmy	2.25		In liquidation.
Rohag. m. b. H.	.32	.10	Stock re-apportioned 2:1.
August Wegelin A. G.	2.48	.50	Stock re-apportioned 20:1, then to .50.
Chem. Fabrik Billwarder	3.00	1.50	Stock re-apportioned 2:1.
A. G. der Chemischen Producten-Fabriken Pommerendorf-Milch.	6.66	4.44	Stock re-apportioned 3:2.
Steatit Magnesia A. G.	7.00	3.40	Stock re-apportioned 2:1.
Bayerische A. G. fur chemische u. landwirtschaftlich-chemische Fabrikate	1.00	1.00	Stock re-apportioned 10:6 and increased by .40 mill. RM.
Chem. Fabrik von Heyden	14.84	13.69	Buying back stock
Eggersdorf Salzwerke	4.50	2.23	Buying back pref. stock & re-apportioned 4:1.
Saccharinfabrik Fahlberg, List & Co.	10.50	1.89	Buying back pref. stock & re-apportioned 4:1.
The Goldschmidt A. G.	18.00	16.20	Buying back stock.
Scheidemandel	10.00	5.58	Buying back and reapportioned 5:3.

No mergers have been effected during the past year.

The Deutsche Gold-und Silber scheideanstalt vorm. Rössler at Frankfort-Main, which was fortunate enough to be able to distribute a nine per cent. dividend for 1931-32, bought a controlling share in the lampblack works of August Wegelin A. G., Kalscheuren bei Köln, for the purpose of revivifying the stagnating lampblack business of Germany, despite competition in this field in Rumania. Activity is also increasing in the solvent branch, due to efforts on the part of I. G. Farbenindustrie A. G. and Deutschen Hydrierwerke A. G. in Rodleben-Berlin. The last named concern produces among other products butanol and acetone from molasses, and other plant waste products by a fermentation process. The same concern, H. Th. Boehme A. G. Chemnitz, and others are intensifying the manufacture of higher fatty alcohols and their sulfonates, which find extensive application in the manufacture of washing and toilet soaps, and, more and more, also in the textile industry. Distribution of these products is partly carried out in close co-operation with American concerns, or much more with new concerns, especially floated for this purpose viz: American Hyalsol Corporation, Gardinol Corporation. The processes, technically perfected by Bergius and Scholler, Tornesch, for the production of motor fuels, on the one side, and foodstuffs on the other from wood, or similar natural raw materials, although commercially feasible, still have to prove their economical value under the strained conditions under which business in general is laboring at present. In the school of the hard knocks of reality many a well thought-out and developed commercial process met with failure, as the history of the chemical industry, from the times of the Leblanc-Soda process to the present, shows.

Commercial chemical processes are relatively short-lived, as they are subjected to continued efforts for their improvement, and it is a peculiarity of the chemical industry that standstill is quasi identical with obsoleteness. The intensity with which work is still being carried on in the German chemical industry is indicated by the numerous publications and patents. Of the German patents and trade-marked articles allowed during 1931, the Siemens-Concern alone secured 1,237 German patents and 1,445 trade marks; the I. G. Farbenindustrie A. G. 1,245 patents and 141 trade marks. Noteworthy are novelties as Sinterkorund, Tornesit, Widiahartmetall, the magnesia objects Tylose, the Eloxal process and new heat resisting materials.

It would lead too far to go into a detailed discussion of these inventions. Their appropriate exploitation, will, for the greatest part, have to be deferred until business conditions have improved, which, it is hoped, will be the task of the still young year 1933.



I. G. Synthetic Nitrogen Plant at Merseburg, Germany

Italian Chemical Industry and Production, 1932

By Dr. Massimo Treves
Director, L'Industria Chimica (Torino)

THE financial crisis which the world thought had reached its lowest point in 1931 still holds sway in 1932. Chemical industry, naturally in line with the influences of this readjustment has been deterred from pursuing the paths of progress mapped out in our general provisions.

High tariff walls raised in many countries have increased the difficulties in exporting thereby reducing our national production.

Our present statistical data unfortunately has only been prepared for the first ten months of the year, that is to October, 1932, but is an accurate representation of the development during that period.

Quotations from information received from the customs, show the value of products imported in the month of October past as 551 millions of liras as against 786 millions of liras in October, 1931, and that of exported products 589 million liras as against 836 million liras in October, 1931. In the entire first ten months period of 1932 the value of imported products was 6,895 million liras, that of exported products 5,603 million liras with a difference of 1,292 million liras, while in the same period in 1931 the value of imported products was 9,900 million liras, that of exported products 8,369 million liras with a difference of 1,531 million liras. One should understand, however, that, while in the first six months of 1931 we imported products on our reparations account, which amount is not included in the value above indicated, no importations under this account were affected in the first ten months of 1932.

According to the Ministry of Corporations, in the first nine months of 1932 Italy has produced the following:—(the figures in parenthesis indicate production in the corresponding period of 1931): 23,967,748 quintals of finished cement ground in 138 cement plants (23,720,916); 4,723,706 quintals of superphosphates in 87 establishments (6,301,587); 23,507,040 kgs. rayon in 27 plants (25,514,226); 1,988,702 kgs. natural silk in 776 plants (4,093,383); 749,963 quintals copper sulfates in 16 plants (608,122); and 2,431,320 quintals paper and cardboard in 250 paper mills, which on the date of receipt of this data employed more than 15 workmen (2,428,020).

The production of benzine in October, 1932 was 14,585 tons, a reduction of 48 tons with respect to the production of the preceding month of September (14,633 tons) while it was 12,812 tons in October, 1931. Between October and September, 1931, there was an increase of 2,030 tons.

In the first ten months of 1932, 129,133 tons of benzine were produced, while in the corresponding period of 1931 the production was 108,612.

Tables are included here summarizing the principal chemical products imported and exported in September and October, 1932, with data on quantities and values of the products imported and exported from January 1, up to and including September, 1932, showing a comparison with similar figures during the same period in 1931.

In the general review of the movements of the chemical industry in 1932 we find much comforting data.

Oils and Soaps

Data in complete form relative to the movements of imports and exports in 1932 as well as quantities of production will not be available until after the first few months of the coming year. From the study of the data verified in the first six months of the current year and from the general examination of the workings of the related industries in these last few months we can arrive at certain deductions which are very nearly correct.

The progress in the manufacturing of seed oils was maintained practically the same as in 1931. This also applies to the quantity produced, which in the first semester in 1932 was 389,735 quintals, being equivalent to the production of the entire year of 1931 of 758,461 quintals. Prices, however, have undergone a considerable reduction in comparison to the lower-

ing of seed prices. The average reduction of quotations is about ten per cent. up to the end of 1931. The lowering of prices having increased the margin between these oils and olive oils, the government, in answering the wishes of the cultivators of olives has raised the tariff on oil seeds destined for household use. These recent increases have increased the cost on oils produced by 40 liras per quintal. With respect to seeds that are widely used, arum imports have been radically decreased. Imports in the first six months of 1931 were 831,714 quintals lowered to 520,440 quintals for the same period in 1932. Italian seed gatherers have, however, largely profited by the favorable conditions of the cole seeds market and the importing of these seeds has been raised from a few thousand quintals in 1931 to 422,171 quintals in the first six months of 1932.

During the year there were placed in operation four new refineries all of medium or small importance. We have ideas for forming a consortium between the producers of edible seed oils through which we propose to regulate the production of seed oils in relation to the Italian olive harvest.

Imports of linseed were practically the same as 1931. It is true that this industry had an abundance of orders in spite of the fact that the prices, in view of foreign competition were far from being remunerative.

The refineries working for national supply were in the main fairly active; which was not true of the plants working for exporting and which refined oils for temporary importations. We can calculate that the sales of these refineries are about one-third less than those of last year. This is caused not only by the general economic crisis, but also by the continued and increasingly bitter customs barriers, emphasized by the severity in the execution of these controls on the part of the customs authorities.

The sulfonated oil industry is the one which will probably be in the worst condition in the entire commerce of olive oils. Having received no accurate data, we believe that the production in 1932 has been considerably inferior to that of 1931. However, exports have not been materially reduced, at least in the first six months (63,786 quintals in 1932 as against 67,188 in 1931). The cause of this difference is laid to the high prices paid for the base products which does not leave a fair margin in their extraction; not even for oils of low acidity, which latter find in the refining food industry an outlet more restricted than formally. This is caused by the lesser demands for these oils which naturally has harmed their sale considerably. The crisis in the wax industry has also acted unfavorably in the use of sulfonated oils.

The situation of the soap market which had remained fairly active in 1931 has gradually become worse in 1932. This is more noticeable in the second semester. The excessive competition between manufacturers has depressed quotations to such an extent as to nearly cancel the margin of profit. Production, however, has not been greatly diminished and indeed if there is a lessening of consumption it has not been enough to be considered seriously as far as the absorption of the product is concerned in the national markets.

In the first six months imports of soap bark were decreased (from 42,311 quintals to 35,901 quintals),

IMPORTS OF PRINCIPAL PRODUCTS
General Offices of Customs

	From Jan. 1 to end of September			
	1932	*1931*	*1932*	*1931*
Merchandise	*Quantity*		*Value (Liras)*	
Oil bearing seeds, quintals	2,169,429	2,001,162	156,790,742	214,160,965
Vegetable Oils (except concrete oils), quintals	403,140	780,217	111,035,670	297,506,326
Rayon and rayon products, kg	736,375	1,142,644	16,483,354	38,419,063
Pyrites of Iron and Cuprite, tons	69,726	78,343	5,043,492	8,803,244
Copper in pig and scrap, quintals	344,678	375,246	92,093,227	162,407,623
Aluminum and its alloys in ingots and scraps, quintals	104	10,436	23,338	8,066,958
Aluminum and its alloys in castings bars, sheets, wire and tubes, quintals	1,209	4,515	2,341,657	8,236,537
Tin in pig and scrap, quintals	27,872	28,220	24,924,000	30,837,811
Zinc in pig and scrap, quintals	11,069	14,963	1,062,215	2,305,447
Coke, tons	6,432,760	7,093,038	504,023,667	845,888,547
Phosphate Rock, tons	291,674	365,825	26,274,507	34,141,678
Raw Mineral Oils, quintals	886,489	756,377	16,871,495	21,752,016
Lubricating Mineral Oils, quintals	504,832	554,216	50,518,851	70,455,448
Petroleum, quintals	961,391	1,067,322	21,652,975	47,587,990
Benzine, quintals	2,370,271	2,789,783	85,674,621	196,135,001
Residues from the distillation of mineral oils, quintals	6,010,587	6,308,357	75,331,448	131,270,730
Solid Paraffine, quintals	159,520	170,308	20,896,851	25,333,462
Sulfate of Copper, quintals	74,445	86,745	10,264,670	15,922,049
Raw Nitrate of Soda, tons	25,856	46,336	19,522,170	41,467,707
Calcium Cyanamide, tons	2,462	.....	936,450	.....
Sulfate of Ammonia, tons	274	5,425	145,498	4,141,363
Fertilizers—chemical, potash, tons	23,426	11,778	12,671,936	7,646,173
Other Chemical Fertilizers, tons	22,872	29,433	3,999,479	6,284,894
Raw Elastic Rubber, quintals	116,032	82,621	19,953,321	26,631,837
Cellulose, quintals	1,367,288	1,275,711	95,066,106	132,368,312
Seeds non-oily, quintals	118,019	55,679	13,199,859	11,499,613

EXPORTS OF PRINCIPAL PRODUCTS
General Offices of Customs

Merchandise	*From Jan. 1 to end of September*			
	1932	*1931*	*1932*	*1931*
	Quantity		*Value (Liras)*	
Olive Oil, quintals	375,469	475,198	134,782,938	199,106,025
Pyrites of Iron and Cuprite, tons	206,352	174,947	15,536,720	18,333,927
Zinc Minerals, tons	25,637	55,134	2,192,900	12,148,202
Aluminum and its alloys in Ingots and Scrap, quintals	2,298	20,676	1,986,175	14,729,338
Aluminum in castings, bars, sheets, wire and tubes, quintals	277	368	362,570	640,347
Mercury, quintals	4,679	3,541	13,889,110	18,596,764
Marble-unfinished, tons	68,613	83,675	20,178,788	27,053,697
Sulfur, quintals	906,171	1,852,908	83,541,504	91,095,732
Essence of grains, kg.	415,224	726,877	16,068,867	27,092,775
Sulfate of Copper, quintals	13,243	32,347	1,815,671	5,319,626
Citric Acid, quintals	12,454	13,502	7,984,064	13,193,430
Tartaric Acid, quintals	10,855	18,008	8,124,910	17,774,439
Citrate of Calcium, quintals	3,839	11,667	778,250	2,942,482
Raw Tartar and Cask residue, quintals	66,947	72,563	15,243,966	22,869,183
Wine Sediment, quintals	8,916	9,595	591,802	1,076,435
Cream of Tartar, quintals	4,133	7,146	2,413,201	6,593,400

animal fats n. n. (from 25,706 to 10,884), palm oil increased (from 108,350 to 126,280), vegetable oils n. n. for industrial uses (from 16,293 to 30,947), this last increase due in large measure to the so-called acid oils frequently offered on the market under very favorable conditions.

The imports of common soaps (nearly all from Marseilles) is rapidly diminishing for the Italian soap factories have been emphasizing the importance of manufacturing Marseilles type soaps in order to dominate the national market.

The glycerine market has been quite depressed, nevertheless, soap factories provided with deglycerinizing plants have continued to operate. A new and important refining plant belonging to the firm of V. Lo Faro of Genoa has entered this year in full operation.

The paint, varnish and color industry has also felt the lessening demand in the many industrial branches to which it furnishes supplies. In spite of this, we can show that the Titanium Society Inc. has, by the notable perfection of its methods of manufacture, been able to maintain production in 1932 paramount with that of 1931. This also applies to Duco, an Italian incorporated firm of Milan, which has been able to continue without interruption its industrial program initiated in 1929 in the field of nitrocellulose varnishes. In the automobile industry, particularly, duco varnishes have attained a very flattering degree of consumption. Besides these varnishes the the S. A. I. Duco started in 1932 the manufacture of smalt varnishes under the trade name "Dulox" made on a base of glyceric resin for which there was built, at the Avigliana establishment, a large new plant. Another application in the use of glyceric resin will be the introduction of nitrocellulose smalts obtaining, thereby, united products which will be shortly placed on the market under the trade name "Pyralyx." In summing up, the industrial and commercial activities of S. A. I. Duco, in the year 1932, has resulted in an increase of 68 per cent. over that of 1931 and of 167 per cent. over that of 1930.

The cracking industry in Italy is represented by four establishments. One in Spezia (Migliarina) of the Italian Industrial Petroleum Society; one in Naples of the Italian Benzine Society (Benit); one in Marghera owned by the Italian Society for the Distillation of Combustibles Inc.; and a plant of the Fiume Refinery called "Remsa."

To these must be added the "Triestina Refinery of Triest"; the two refineries of Fornovo (Italian Petroleum Society) and of Fiorenzuola (Petroleum of Italy), and the refining plant of the R. Terme of Salsomaggiore. These eight plants produce about ten thousand tons of benzine per month, which quantity represents about 95 per cent. of the entire Italian production.

Italy, after the war, coming into possession of the large deposits of bauxite of Istria has greatly increased her production of aluminum, raising it from 5,000 tons in 1913 to 143,000 tons in 1930, reduced however to 73,000 tons in 1931. From bauxite we produce aluminum in the plants at Bussi (Abruzzo); and at Porto Marghera (Venice). Italy also owns considerable deposits of leucites ($4SIO_2Al_2O_3.K_2O$) from which mineral, through the G. A. Blanc patents, aluminum and potassium salts are manufactured on an industrial scale in the great plant of Aurelia.

This plant was constructed in 1930 by the Naples Society of Chemical Products (controlled by the Aluminum Corp. of America) following agreements previously arrived at with the Italian Potassium Society, proprietors of the Blanc patents and controllers of the Leucite mines.

The Aurelia establishment on which the P. C. N. finished construction in the second semester of 1931

though giving the appearance of a large plant is only the first step in the development which the American group proposes to have for working leucite in Italy and which, when completed, will have a potential capacity to take care of about six times the present capacity of the actual establishment.

The plant is supplied by its own central electric system housed in a very modern building and used for concentration of nitric acid. In its present dimensions it will have facilities for treating 28,000 tons of leucite annually, and extraction of 8,400 tons of potassium nitrate and 5,500 tons of aluminum. This work, initated in August, 1931, continued uninterruptedly until the month of February, 1932, gave very satisfactory results. Public homage was paid to the inventor in the report which the Executive Council of the Naples Society of Chemical Products gave to its stockholders in their balance sheet of 1931.

In order to relieve itself of the world crisis in aluminum, the American group, which controlled the P. C. N., decided in March, 1932, to temporarily suspend the work at Aurelia. However, the establishment has been kept in perfect order ready to operate, waiting for the time when industrial economic conditions will permit the reworking of this very important establishment.

Fertilizer Question

In October, specialists in agriculture and agricultural chemistry, from the various countries together with the representatives of the various groups of chemical fertilizer producers, gathered in Rome to study the actual situation in which the chemical fertilizer industry found itself and ascertain the cause for the reduction in consumption.

Among the problems of major economic interest in the various countries, and more especially in their agrarian production, the one of chemical fertilizers is of essential importance, inasmuch as it had been verified that there has been a general tendency to reduce their usage. Italian factories producing mineral superphosphates have a capacity considerably in excess of the maximum needs of phosphate fertilizers reached in this country.

The "Montecatini" alone possesses 57 plants with a productive capacity of 16 million quintals; to these must be added the 14 co-operative factories of the agricultural group belonging to the consortium of Italian Agrarian Federations with a production of about 3,000,000 quintals and 12 factories belonging to various producers. The entire production capacity of these reaches a total of 22 million quintals, more than sufficient to supply the demands of national agriculture, and able to take care of the eventual increased consumption of superphosphates.

Regarding nitrogen fertilizers, the "Montecatini" group has an annual production of 48,725 tons of nitrogen obtained synthetically in its plants at Sinigo, Crotone, Mas and Novara, and is able to supply largely the Italian needs of nitrogen fertilizers. Bearing in mind the factories for the production of nitrogen cyanamide and minor producers of synthetic nitrogen and of by-product nitrogen from the gasometers, we have the realization of the tremendous organization of the national fertilizer industry which has been able to supply to Italian consumers the materials they need without having recourse to foreign importations.

Development of the rayon industry in Italy is truly surprising. In 1913 production in Italy was 150,000 kg., representing 1.36 per cent. of the world's production. This increased in 1931 to 34,250,000 kg. or 16 per cent. of the world's production.

In Italy as in all other industrial countries of Europe and America, the explosives industry is passing through a particularly grave period. The plants of this industry have been equipped in the most modern technical manner but the consumption of commercial explosives (dynamite, its derivatives, black powder, etc.) have submitted, in 1932, to a contraction in their production of 30 per cent. less than that of 1931. The prices also remain at a depression point and according to reports are only about double those before the war.

Ten years of intense work, from 1922 to 1932, have left their indelible traces, and have brought Italy to the point where we can rely upon being furnished with the products required through our own resources. Previously, we had to rely upon foreign production.

An index of the development of the chemical industry is given in the production of sulfuric acid and the alkalis; in sulfuric acid the production of 7,047,600 quintals in 1922 increased to 8,069,144 in 1931 after having reached 12,499,600 in 1929; for sodium carbonate and caustic soda the production from 849,000 quintals in 1922 reached 2,100,000 in 1931 having, however, been up to 2,400,000 quintals in 1929. Figures for 1932 are not yet available.

At the end of 1931 the situation in the chemical industry can be shown as follows:

Capital employed	liras	5 billion
Value of Products	"	6 billions
Value of Exports	"	898 millions
Producing Companies	No.	3,154
Employees	"	158,300

Making exception of some industries which have felt the effects of the world crisis more than the others among which are the following: citric acid, tartaric acid, the essences, seed oils, sulfonated oils and tannic extracts, all the others have done entirely satisfactory work, and Italy is fully reliant upon its chemical industry.

Chemical Facts and Figures

U. S. a "Dumping Ground"?

Manufacturing industries, balked, in many instances, in the past six months in attempts to obtain dumping orders on imports in huge quantities from countries with depreciated currencies, turned from customs officials to the Tariff Commission and the House Ways and Means Committee for action in the past month.

Chemical industry has in the past six months presented several cases before Commissioner of Customs, F. X. A. Ebie, but, has not been alone in experiencing terrific competition from products produced in countries who have abandoned the gold standard. Products as far apart as laces, fertilizers, and grass rugs have been brought into this country at prices so low as to seriously effect domestic manufacturers.

Custom's Hearings

The 1931 chemical import figures show tremendous expansion in the tonnage of sulfate of ammonia. Placed on the free list in the tariff act of 1930 as a concession to the farmer, foreign producers immediately began to ship large quantities to the U. S. at prices considerably below those quoted by domestic factors. In April of 1932 Assistant Secretary of the Treasury Lowman opened hearings on alleged dumping. In August, he issued orders against certain of the countries of origin. Since then the procession to Washington has been increasing by leaps and bounds, each particular group endeavoring to obtain relief through Treasury Department action. On Oct. 27 Mr. Ebie entered orders of suspected dumping of manganese ore from Russia, Brazil, British India and the Gold Coast of Africa, and against stearic acid from the Netherlands. Hearings were also held on alleged dumping of a long list of animal, vegetable and marine oils. In most instances, the Commissioner of Customs denied dumping orders, ruling that the existing conditions were the result of depreciated currencies. At a hearing Nov. 10 Mr. Ebie stated: "One of the dark clouds hanging over international commerce today is the depreciated foreign currency, the root of the trouble."

Convinced at length that very little satisfaction could be obtained through appeals to the customs authorities, due to their lack of authority to handle this new problem, industrial leaders, have concentrated their attention on hearings before the Tariff Commission. The way was paved for such action when the President ordered the Commission to make an investigation.

Meanwhile Rep. Hill of Washington introduced a bill which would provide automatic increases in tariff rates against countries with lowered currency. A large part of the time of the House Ways and Means Committee in the last ten days of January was consumed in taking testimony. Newspaper reports from Washington did not give a clear picture of the situation. Two distinct and separate hearings were held; the Tariff Commission confined itself to testimony for and against further use of American valuation rather than foreign valuation as a basis for ad valorem duties. Ways and Means Committee hearings were confined to testimony on depreciated currencies.

Leaders Testify

Industry and labor joined hands at the Ways and Means Committee hearings, demanding passage of the Hill Bill. James A. Farrell, former U. S. Steel president, and Mathew Woll, president of the American Wage Earners' Protective Conference, and a power in the councils of the American Federation of Labor, advocated immediate action. Said Labor Leader Woll: "It is one way in which we could halt this country from being a dumping ground for foreign goods made by cheap labor."

Chemical Industry Represented

At the Committee hearings and also before the Tariff Commission, spokesmen for an imposing list of industries appeared to testify to existing conditions in their respective fields. Chemical industry was represented by M. C. A. secretary, Warren N. Watson and John G. Lerch, N. Y. Customs attorney, and former valuation expert of the Tariff Commission, who spoke for the Synthetic Organic Chemical Manufacturers' Association. The latter organization had a large delegation present. In addition to President August Merz and the S. O. M. A. secretary, C. A. Mace, Fred Zinsser of Zinsser & Co.; W. F. Van Riper, du Pont; Ralph Dorland of Dow; Victor Williams of Monsanto; and John A. Garvin of Merck and others were present.

THE MONTH REVIEWED

Jan.

7 Cosach is taken over by Chilean Government. (148)

17 Flaxseed farmers and crushers request duty changes. (160)

19 Standard Wholesale Phosphate answers "import charges." (153)

20 Guy H. Buchanan dies. (146)

21 President-elect Roosevelt visits Muscle Shoals. (153)

23 Compressed Gas Mfrs. Association holds annual meeting. (148)

26 Tariff Commission hearings on "American Evaluation, and Ways & Means Committee hearings on "Depreciated Currency." (145)

30 Freeport Texas stock offering over-subscribed. (161)

31 Du Pont shows net earnings of $1.82 a share. (163)

31 Senator Hatfield forecasts Chilean nitrate "dumping." (147)

American vs. Foreign Valuation

Mr. Lerch in his testimony before the Tariff Commission said importers' statements of the foreign value of a commodity are "often fiction," and that there is no legal way to compel importers or foreign producers to give the exact foreign value of their product. The result he said, is that the assessment base does not accurately reflect foreign costs, and American producers "are the goat."

The witness also stated that by changing from the foreign value base to the American the selling price could be determined, and this would eliminate the large crops of foreign investigators now maintained to determine the foreign values of commodities.

Proponents of the change to American valuation called attention to the large number appearing for the proposal and the little opposition appearing against it. The only voice raised in objection was that of James W. Bevans of New York, representing the National Council of Importers and Traders.

1930 Tariff Act Nullified

It was brought out at the Ways and Means Committee meetings that the currencies of several foreign countries, now large exporters to us, have depreciated from 25 to 60 per cent. This means that foreign goods are being appraised at from 40 to 75 per cent. of the value contemplated when the 1930 tariff act was passed. Elaborating further on these figures Thomas J. Doherty of New York, tariff counsel for the American Iron and Steel Institute, stated: "This means a terrific loss of revenue to the Government and is absolute repeal of the tariff law so far as it assumes to protect American labor and industry."

Resorting to the drastic discharge petition on Jan. 28, after Democrats had bottled up the plan in the Ways and Means Committee, House Republicans insured a vote Feb. 13 on legislation similar to the Hill Bill. On the same day the

Senate adopted a resolution by Senator Costigan, Democrat of Colorado, calling upon the Tariff Commission and other governmental agencies to supply all the tariff information that might be helpful to the incoming administration in bargaining with other nations for reciprocal import duties. A second measure, also approved, asked the commission for an analysis of foreign trade.

The measure which received the necessary 145 signatures is by Representative Crowther, Republican of New York. It is quite similar to the Hill Bill, and would make the Tariff increases automatic in a ratio based on the percentage of depreciation of the currency.

"It levies a countervailing surtax," Mr. Crowther explained, "so that we will collect in duties exactly what we intended to collect when we wrote the tariff act of 1930." Plan would be administered by the Treasury. Officials of that department are said to be opposed to the Hill or Crowther Bill, preferring a plan to be administered by the Tariff Commission through a broadening of its flexible powers. It is thought that the necessary majority will be obtained on Feb. 13 to obtain consideration of the Crowther measure.

Method Immaterial

Industry is more interested in obtaining immediate relief than in the method employed. It makes little difference whether the barrier against cheapened foreign goods is erected by the Tariff Commission or by a bill such as the Crowther or Hill Bills. Those closely in touch with the situation believed, that the change to American valuation, the immediate question before the Tariff Commission, will be slow and is something for the future, while immediate action can only be gotten through the depreciated currency angle and an act of Congress such as the passage of Hill & Crowther measures.

Specific Chemical Examples

Chemical industry and particularly the fertilizer field has been apprehensive over the influx of foreign materials for the past eight or nine months, Chemical Markets, Oct., 1932, p. 337). Japan appears to be the most serious offender. Reports from the Coast state large quantities of sulfate and superphosphate have been coming in regularly. Last fall Japanese alkali producers were reported quoting in New York considerably below existing market quotations on caustic and "bicarb." These quotations were withdrawn before any material was actually delivered at Atlantic points however. Producers of certain chemicals report, that while tonnages in many instances of products being imported are not very large, they are being offered at figures that have brought about a demoralization of the domestic price structure.

*Feb. 3, Speaker Garner stated, "There will be no foreign depreciated currency legislation enacted at this session."

Little Chance to Pass*

Reports from Washington, as the month closed, indicated that while sufficient sentiment is believed to exist in the House to secure passage of the depreciated currency bill, that the time is too short to bring about concurrent action by the Senate. There is said to be a division within the ranks of the two parties over this legislation. In Republican ranks the industrial East and agricultural Middle West are at odds on the question of giving further protection to manufactured products. On the Democratic side, there is said to be some resentment that Republicans have taken such a prominent part in the question, and a desire on the part of the former to sidetrack any action until after President-elect Roosevelt assumes office.

Obituaries

Dr. Samuel A. Goldschmidt

Dr. Samuel A. Goldschmidt, 84, chairman of the board of Parsons Ammonia Co., intimate of Dr. Charles F. Chandler, member of a large number of technical societies, and widely known in the industry, died Jan. 28 of apoplexy at his home in N. Y. City.

Dr. Goldschmidt received his education at City College, graduating in 1868. Three years later he received degree of Mining Engineer from Columbia School of Mines, and for several years thereafter was engaged in research work with Dr. Charles F. Chandler.

In 1880 Dr. Goldschmidt became treasurer of Columbia Chemical Works, later Parsons Ammonia, of which he was president from 1894 to 1915, then chairman of the board. From 1870 to 1877 he was an associate editor of *The American Chemist*. Emory College of Georgia awarded him an honorary degree of Doctor of Philosophy.

Guy H. Buchanan

Guy H. Buchanan, 45, Cyanamid's brilliant chief technologist, died suddenly Jan. 20 of pneumonia after an operation. He was educated at Washington and Lee and M. I. T. After serving New England Coke and later N. J. Zinc in various capacities, he was appointed in 1916 assistant professor at "Tech." In 1917 he went with Cyanamid, and he assisted Dr. Walter S. Landis in building Muscle Shoals Plant No. 2. With the cessation of hostilities, Dr. Landis brought back his assistant and placed him in charge of the company's research laboratories at Warners, N. J. In a short time Mr. Buchanan was made chief technologist and his activity covered the entire range of Cyanamid products. He was a noted authority in the cyanamid, cyanide, plastics and resins, and flotation reagent fields. He was the author of a number of special articles in CHEMICAL MARKETS, and our "We" page said of him (Oct. 31) "Under austere countenance Cuy H. Buchanan hides a warmth of feeling that continually crops out in unexpected ways. He has never been known to waste a word in writing a technical report, but he continually takes time to make valuable and timely suggestions to fellow research workers."

Sudden death prematurely ends brilliant career

Helen Dunham Williams Haynes, widow of the late David Oliphant Haynes, former president of D. O. Haynes & Co., died Feb. 4 at Tampa, Fla., after a lingering illness. She is survived by three sons, Williams Haynes, publisher of CHEMICAL MARKETS, Hasbrouck Haynes, and D. O. Haynes, Jr., and two daughters, Mrs. Helen H. Adams and Mrs. Bartlett H. Travis.

COMING EVENTS

American Ceramic Society, Pittsburg, Feb. 12-17.

Technical Association of the Pulp and Paper Industry, Hotel Pennsylvania, New York, Feb. 13-16.

American Society of Biological Chemists, Cincinnati, April 10-12.

American Chemical Society, Spring Meeting, Washington, March 26-April 2.

Eighth Annual N. Y. Drug, Chemical & Allied Trades, Dinner, Waldorf-Astoria, March 16.

The Electrochemical Society, Montreal, May 11-13.

American Society for Testing Materials, Chicago, Hotel Stevens, June 26-30.

American Electroplaters' Society, Chicago, Congress Hotel, June 27-30.

Exposition of Chemical Industries, Grand Central Palace, N. Y City, Dec. 4-9.

American Society of Mechanical Engineers, N. Y. City, Dec. 4-9.

Local-N. Y. City*

Feb. 13—A. C. S., Electrochemical Society, Society of Chemical Industry, Societe de Chimie Industrielle.

Feb. 24—Society of Chemical Industry.

March 3—American Institute of Chemists.

March 10—Nichols Medal Meeting of four societies.

***Chemist Club unless otherwise specified.**

Mrs. Pansy B. White, 60, wife of Frederick W. White, president of Mutual Chemical, died Jan. 8 in N. Y. City after an operation.

Julius M. Williams, 70, consulting chemist, died unexpectedly on Jan. 9 at his home in Toronto.

Washington

With industrial leaders and trade association representatives in Washington in large numbers demanding relief from the ever-increasing wave of imports coming

Senator Henry D. Hatfield
Sooner or later bankers will be forced to "dump"

from countries off the gold standard, it is small wonder that most of the interest centered, aside from attempts at balancing the budget, on the fate of the proposed depreciated currency bill, discussed elsewhere in this issue.

Warning

On Jan. 31 Senator Henry D. Hatfield (West Virginia) stepped into the picture with a speech warning of possible "dumping" of Chilean nitrate, and iodine stocks in this country. The West Virginia Senator is well-known in chemical circles. He was the principal speaker at the 1931 M. C. A. annual meeting, his address "Politics and Chemistry" appearing in CHEMICAL MARKETS for July, 1931, p. 31. He, of course, has large chemical industries located in his state, and is considered by the industry at large to be particularly well-informed on chemical matters. Said Senator Hatfield in the course of his recent speech in the Senate on the nitrate situation:

"Sooner or later the bankers will be forced to dump upon the American market at such prices as they can secure to protect the loans which they have made with American money to this foreign monopoly."

He made a similar prediction with respect to a consignment of 450,000 pounds of Chilean iodine—a year's supply—upon which he said an international banking concern had loaned $2 per pound when the price was $4.

U. S. Nitrogen and Iodine

"The Chilean industry's only salvation lies in the destruction of our fixed nitrogen industry and we may expect every effort in that direction by outright dumping upon our markets."

Unless Congress speedily finds a way to prevent continued dumping from this source," he said, "there is no hope of resuscitating the nitrogen industry on the Pacific Coast.

"The new iodine industry, a new chemical development with plants in Los Angeles and Shreveport now producing one-fourth of all the iodine used in America, also is threatened by the dumping of foreign produced iodine in our country," he said.

The West Virginia Senator made rather a thorough analysis of the general import situation, urging Senate action upon depreciated currency legislation. He charged that depreciated currencies are "a tool or weapon to force the cancellation of debts owed to America and to transfer these debts to the backs of the already over burdened American taxpayers."

Government Competition

Little has been heard in the past month of the work being done by the Shannon Committee investigating government competition with private business (Chemical Markets, Jan. 1933, p. 49). Someone "dubbed" the committee "The Sparrow-Hunting Expedition" because, it is said, the work of the committee has been limited to small problems instead of attacking major ones, such as Muscle Shoals. It is not difficult to understand why, at least on this specific question, the Committee has held off to a very large extent. Washington is "at sea" on the incoming president's views, except in a very general way, on Muscle Shoals, and government competition with private business. When pressed for an opinion on the latter, during his visit to the Shoals, Mr. Roosevelt explained that there were two schools of thought on this question, one of which believed that the government should not in any case engage in manufacturing and come into competition with private business, while the other believed that facilities needed in war should be put to peace-time use, so far as possible. He did not elaborate further on this statement.

Dispatches reporting the President-elect's startling program for Muscle Shoals did not contain any specific mention of what he proposes to do with the nitrate plants. However, congressmen who have discussed the question with the President-elect are reported to have stated that his plan contemplates operation of the Muscle Shoals plant under the Norris bill.

Traffic

The M. C. A., through Secretary Warren N. Watson, filed three statements with the I. C. C. in January on matters of importance on traffic. The first, requested that if the commission decided to grant an additional time extension to the emergency rate increases, granted in the fall of 1931 (Chemical Markets, Sept., 1931, p. 289) that a definite time should be stated for expiration of these increases to be fixed in the extending order. The second, petitioned for an extension to carriers of additional time for removing departures from the long and short haul clause of the 4th section of the I. C. C. act now existing under specific commodity rates between points in the Official Classification Territory. Copies of this petition are obtainable from the Washington office of the association. The third, requests certain interpretations on shipments of "dangerous chemicals" particularly on cyanides, cyanamid and sodium nitrate.

Supreme Court Decisions

Supreme Court on Feb. 6, upheld the Presidential power to alter customs duties without revealing confidential information presented by U. S. producers in famous nitrite case (Chemical Markets, Oct. 1932, p. 342). On the same day a decision in favor of Anglo-Chilean Nitrate was given in the suit by the state of Alabama. (Chemical Markets, Dec. 1932, p. 536). Court held Alabama franchise tax inapplicable to stored nitrate.

No Research Moratorium

Proof that the du Pont organizations have not declared a moratorium on research is contained in a list of products perfected by the chemists and engineers of that organization. A partial list includes: dehydrated aluminum sulfate; used in the manufacture of certain new insecticide dusting mixtures and for other purposes; a considerable number of new perfume materials and new detergents; a new and efficient denaturant for ethyl alcohol, rendering denatured alcohol unfit for human consumption without impairing its usefulness in commerce; a new and highly efficient fuel, particularly adapted for certain internal combustion engines and which is used principally in outboard racing motors; use of urea ammonia solution for the ammoniation of superphosphate; manufacture of synthetic camphor by a new and improved process. du Pont is a large consumer of camphor particularly in the manufacture of pyroxylin plastics. Process for manufacture on a commercial scale of chemically pure nitrate of ammonia, used by some manufacturers of anesthetics; an improved process for the production of tin oxide; marketing of methyl formate for use as a low pressure refrigerant has also been initiated. The product has not been used commercially heretofore as a refrigerant; manufacture of a new synthetic rubber, duprene, at a plant erected in Deepwater, N. J. A sufficient commercial demand has been developed, it is reported, to consume the entire output of the present small plant.

Association News

Nichols Award

William H. Nichols medal of the N. Y. Section, A. C. S. for 1933 is awarded to Dr. Wilder D. Bancroft, professor of physical chemistry at Cornell. Dr. Walter S. Landis, chairman of the medal committee made the announcement.

Award, one of the major honors in chemical science, goes to Prof. Bancroft for his work on the application of colloid chemistry to physiological problems, particularly insanity, in which he has advanced scientific proof that dementia and drug addiction are curable chemically.

Prof. Bancroft founded the *Journal of Physical Chemistry* in 1896 and was its editor until last year. He is a member of the A. C. S. of which he was president in 1910; American Physical Society, American Academy of Arts and Sciences, American Philosophical Society, National Academy of Sciences, Electrochemical Society, of which he is an honorary member after serving two terms as president in 1905 and 1919; and the English, French, and Polish chemical societies.

Compressed Gas Elects

F. J. King, chief engineer of Linde Air Products, was elected president of the Compressed Gas Manufacturers' Association at the Annual Meeting held at Waldorf (N. Y.), Jan. 23 and 24.

Engineer F. J. King
Mathieson's Kienle turns over the gavel

This election marks another recognition of Mr. King's outstanding contributions to technical progress in the compressed gas industry. Shortly after graduation from M. I. T. in 1909 Mr. King became affiliated with Linde Air Products as junior engineer. He has been closely identified with the manufacture of oxygen and acetylene and the development of their applications, particularly in the expanding use of the oxy-acetylene welding and cutting process.

A particularly interesting program was arranged by President Kienle, Mathieson vice-president, and F. R. Fetherston, secretary of the association. Of special interest to the industrial chemical field were the papers of A. H. Hooker on "Use of Liquid Chlorine" and "Liquefied Sulfur Dioxide" by F. A. Eustis of Virginia Smelting. Papers by J. H. Pratt, Liquid Carbonic, and F. P. Gross of Air Reduction, are given in this issue, pages 115 and 124.

N. Y. Section Dinner

Members of the dinner committee, drug and chemical section, N. Y. Board of Trade, met Jan. 21 with members of the press at luncheon. On Jan. 31 the reception committee attended a dinner at the Drug and Chemical Club to perfect plans for the eighth annual drug, chemical and allied trades dinner which is to be held at the Waldorf on March 16. Over 200 reservations have already been made. Last years dinner was attended by over 800 executives and members of the drug, chemical and allied fields, and the committee in charge expect to have 1,000 reservations in hand by March 15. N. Y. Quinine's Frank McDonough, new chairman of the section, is in charge; "Gus" Bayer of Merck is chairman of the publicity committee; "Vic" Williams of Monsanto is chairman, and B. J. Gogarty of Rossville, president of the Salesmen's Association, is vice-chairman of the reception committee. Reservations may be made by calling the section secretary, R. C. Schlotterer, 41 Park Row, N. Y. City.

Monsanto's "Vic" Williams
Appointed "Chief Receptionist"

"Chemistry in the Development of Building Materials" was the subject of paper by Dr. Bailey Townshend, manager, Johns-Manville, research laboratories, given before the A. I. C. (N. Y.) Feb. 3.

As a means of stimulating interest of employees in plant safety activities and encouraging them to make concentrated efforts to prevent accidents, friendly competition in the form of accident prevention contests often has proved effective. Practices of a number of industrial organizations in connection with this phase of safety educational work are presented in a report entitled *Methods of Organizing and Conducting Industrial Safety Contests*, published by the Policyholders Service Bureau of Metropolitan Life.

Foreign

An Abrupt Ending

Formality of handing over Cosach to the Liquidation Committee took place Jan. 7. M. B. G. Whelpley, youthful president of the company, painfully remembering his desperate efforts of the past 18 months to ward off just such an end, made the presentation speech. He turned the meeting into one of protest against the Government's decision to force liquidation. A manifesto was issued to quiet any fears regarding the nitrate markets' condition during the change. Statement declares that the process of liquidation will in no way effect the situation on nitrate and iodine and the market will be maintained in an orderly manner. All contracts made will be strictly adhered to and no "dumping" of material will be permitted.

No official statement has yet been issued of the terms on which the reorganization is to be carried out, but opinion in London, according to *Chemical Age* (London), is that a genuine effort is to be made to clean up the finances of the industry. It is believed that the International Loan of 1931 will be treated fairly leniently—or, at least, that portion of it which was issued publicly—but that the bonds issued to Guggenheims and others in satisfaction of pre-Cosach indebtedness will be cancelled or seriously diminished. Similarly, it is thought that the Secured Sinking Fund Bonds, ranking after the public issue of 1931, will be cancelled. Greater part of these were issued to the Chilean Government. It is believed that Chilean Government will surrender all its "A" shares and will regain possession of the nitrate reserves handed over to Cosach; under Law No. 4,863 these revert to the Government, in any case, if the company is liquidated.

"Achema VII," or Cologne chemical industries exhibition, will not be held this year. Date has been set for week of May 18 to 27, 1934. Exhibition of the German Society for Rubber Industries, which was to have been held in conjunction with the Achema, will take place independently during 1933 in Cologne.

English Patent Laws

At a joint meeting of the London Section of the Society of Chemical Industry and Institution of Chemical Engineers, held on Jan. 2, Mr. C. Hollins, B.Sc., A.I.C., legal department, I. C. I., presented a paper in which he enumerated changes in patent law introduced by the new Patents Act of 1932, and discussed some of them in detail. Those in this country interested in securing British patents should familiarize themselves with the new law. A resume appears in *Chemical Trade Journal*, London, Jan. 6.

New Year Honors

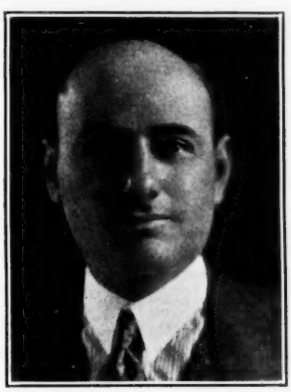
Among those receiving New Year Honors at the hands of the King of England was William J. U. Woolcock, member of the British Dyestuffs Advisory Licensing Committee, chairman of the Dyestuffs Industry Development Committee, and the chairman of the committee of non-official advisors associated with the industrial advisors of the United Kingdom Delegation at the Ottawa Conference last July.

Stora Kopparberg Co., Falun (Sweden), is developing a new process for bleaching sulfate at its Skutsar pulp mill. Details of the process are not available but the statement is made that bleaching is done in several stages and in such a way as to conserve considerably the strength of the pulp. It is reported that paper made from unbleached sulfate with a folding ratio of 3,000, retains a ratio of 2,000 when bleached by this method while other methods now in use, reduce the ratio to 50 or 100. Production has not progressed beyond the experimental stage, but a marked improvement in the manufacture of chemical pulp is indicated.

British Industries Fair opens Feb. 20 and continues to March 3.

Unemployment Insurance

Sam A. Lewisohn, vice-president and treasurer, Miami Copper, vice-president, The Tennessee Corp. (formerly Tennessee Copper and Chemical) speaking at the annual Personnel Conference of the



Sam. A. Lewisohn
"Business men are imitating the ostrich"

American Management Association, Feb. 8 warned his hearers that "compulsory unemployment insurance is coming and business men should make up their minds to do something about it."

Saying that he was not venturing an opinion "whether compulsory insurance legislation requiring the setting up of unemployment reserves is desirable," Mr. Lewisohn declared that such insurance under certain conditions "could prove a very useful palliative, though of course not a cure, for meeting conditions which seem inevitable under our present society . . . But, if the medicine is not to be worse than the disease we must decide just how it is to be administered . . . It is deplorable that business men in imitating the ostrich are abstaining from participation in guiding this legislation or even from devoting any serious thought to it."

Types of Unemployment

Here Mr. Lewisohn made the distinction between what he terms "fair weather unemployment" and "hard times unemployment," defining the first as that occurring each year in seasonal trades and because of labor saving devices. Without naming the champions of technocracy, he referred to "the extravagant claims that the machine has created a permanent pool of unemployment" and declared that "such forebodings of imaginative statistics will probably prove as sound as Malthus' fears that the population will outstrip the food supply of the world." He also placed in the fair-weather class, unemployment in such casual trades as the longshoremen and in obsolete industries, and pointed out that each of these have in common the fact that when their workers are idle, though it may take an unnecessarily long time due to the lack of employment facilities, the men can ultimately find jobs.

Since distress is apt to be much milder during fair-weather unemployment because the number of the unemployed "is but a small fraction of those who find themselves out of work during hard times . . . the depth and breadth of these two problems vary to so great an extent as to make them different not only in degree but in their very nature. The one is a great social tragedy which menaces our entire economic system, the other a localized temporary disaster. One is individual sickness, the other an epidemic."

Mr. Lewisohn believes, that "the alleviation of 'hard-times unemployment' is essential. The alleviation of the constant 'fair-weather,' seasonal and technological unemployment may be useful but is non-essential. The danger is that the latter,—the non-essential—may drain the former, the essential, and fritter away our reserves. Therefore, a long waiting period is important."

Chemists' Club (N. Y.) held the first of its February bridge tournaments Feb. 1, and the second will be held on the 15th.

Company News

Atlas Powder is marketing "Blakstix" a new coal mining explosive.

Parr Instrument Co., 222 52 st., Moline, Ill., has been organized by H. L. Parr and other associates of the late Prof. S. W. Parr and has acquired scientific instrument business of Burgess-Parr Co.

St. Louis plant of Monsanto won the President's Safety Trophy for the last quarter of 1932.

Scott L. Libbey Corp., importers and manufacturers of dry colors and chemicals, moved to 59 Pearl st., N. Y. City from 104 S. 4 st., Brooklyn.

Du Pont Cellophane filed suit in District Court for the Southern District of New York against S. H. Kress, Inc., chain store merchants, and also filed action in the United States District Court for the Eastern District of New York against Waxed Products Co., Brooklyn, N. Y., alleging concerns had sold as "Cellophane," products not made by the du Pont Cellophane.

Carmen Co. will start work on a new $125,000 factory at Boonton, N. J. to make soap specialties. Building will be erected adjacent to Wecoline Products plant, which will supply former with materials.

Badger Supply, Eau Claire, Wis., formed to deal in chemicals.

Du Pont Cellophane made substantial reduction in price of transparent cellulose films used for wrapping purposes, Jan. 11. This is the 15th reduction in price since domestic manufacture of cellophane was started in 1924.

Patterson Foundry & Machine, East Liverpool, has entered the stoker field.

American Gas Furnace, Elizabeth, N. J., has developed a new Bell type Retort Furnace. Details are available from the company.

Walter L. Tappan of Westchester County, N. Y., filed a petition Jan. 13 in Delaware Chancery Court asking for appointment of receiver for Kerr-Remington Salt.

Canadian Industrie, Ltd., has reduced price of Cellophane, effective retroactively to beginning of the year.

Canadian Carborundum Co., Ltd., has put into operation $250,000 extension to its plant in Niagara Falls, Ont.

Chemical Fads and Fancies

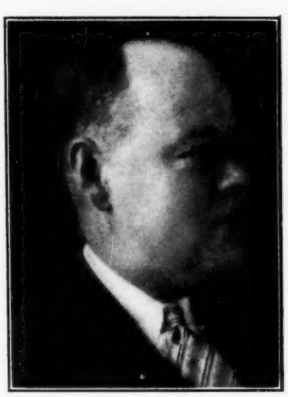
Charles Hardy, president, Charles Hardy, Inc., sailed recently on the

Percy C. Magnus
New Board of Trade Head

"Aquitania" for a six weeks European trip.—Same day S. M. Clark, Whitaker, Clark, and Daniels, sailed with Mrs. Clark for a month's stay in California.—Hercules Powder is 20 years old this month.—William Steele Gray, Jr., son of William S. Gray, was elected president of the Central Hanover Bank and Trust. Thirty-five years of age, he is the youngest bank president ever to take the reins of a large New York bank.—Add this to the list of new and novel uses: in Texas ranchers are now branding cattle with a chemical solution instead of the branding-iron.—Columbia's Colin C. Fink, first brought into prominence by his chromium-plating work and again only recently by his work on electrodeposition of tungsten, told members of the American Institute of Electrical Engineers that "An aluminum age will be the next metal age."—The Daniel of Meht and Daniel is now in this country, looking for agents to handle some of his products.—Jungmann's Gutschew returned Jan. 21 after a six weeks trip in Europe.—"Doc" Dorland asked for a months leave of absence, and will go to Florida.—The era of "free-air" for tires is doomed, according to Tulane professor, Dr. A. B. Cardwell, who reports producers of nitrogen are developing plans for the sale of the gas through filling stations. Experiments show considerably less deleterious effect on inner-tubes.—Charles L. Huisking and "Gus" Bayer of Merck were among those who sailed Jan. 28 on the Franconia (chartered by the National Retail Druggists' Association) for a 10 day sojourn in the West Indies.—Charles Huisking will be toastmaster for the March 16 drug and chemical section, N. Y. Board of Trade Dinner.—Maybe Al Smith will be the speaker.—Frank McDonough of N. Y. Quinine is the new section head.—Percy C. Magnus has been made president of the Board, after serving as the drug and chemical section head for two years.—The two hundredth anniversary of Priestly's discovery of oxygen will be celebrated next month. A new method of distributing anti-freeze alcohol may be adopted after March 31.—James J. Hailey, Niagara Alkali traffic manager, has been elected president of the Transportation Club of Buffalo.—Charles H. MacDowell, former president of Armour Fertilizer, has resigned his directorship in Armour & Co.—Executive U. S. I. vice-president, Glenn Haskell, elected president of the Alcohol Institute, Hamilton, representing Pennsylvania Sugar is vice-president, and Grimm of American Commercial Alcohol is treasurer. Dr. Marks, succeeded himself as secretary.—Horace Bowker, A. A. C. president, suggests moratorium on "plans, short-cuts to prosperity, and blue-prints for revising the social order" before a

A. A. Holmes
Back after a year in Europe

meeting of farmers, bankers and merchants in Buffalo.—"Dave" Litter, president of D. H. Litter, left Jan. 29 on a business trip to the far West.—"Andy" Holmes, G. Ober & Sons, Baltimore, is back after being in Europe for nearly a year.—Dean Frank Whitmore, Penn. State; M. L. Crossley, Calco; and J. G. Vail of Philadelphia Quartz were on the program of the Atlantic City meeting of the American Association for the Advancement of Science.—G. A. Farrington, Chemical Appliances, Inc., is now in Europe in the interest of the Broadfeld Acidulating Unit.—Max Woldenburg, president of A. Daigger, Chicago, spoke recently over WIBO on "Chemistry During the World War and the Advance of Chemistry Since the War."—Williams Haynes, publisher of CHEMICAL MARKETS, spoke before the St. Louis Section of the A.C.S. on Feb. 6.—New Chemists' Club (N. Y.) members include Parke Lowe Boneysteele, district manager for American Bitumuls; J. W. Hanson, Jr., general manager of Richards & Co.; Maurice L. Wilson, industrial engineer with Commonwealth & Southern.—Glyco Products' manager, Harry Bennett, returned recently from a 16 day pleasure trip to Honduras.—Frank McNulty of J. A. McNulty & Co., was away ill for three weeks in January.—Pierre du Pont is being mentioned for the Treasury post.—Dr. E. A. Hueser, distinguished latex authority has resigned from the Kolloid-Chemische Laboratorium of the Metallgesellschaft of Frankfurt, Germany, and is now with Semperit Oesterreichisch-Amerikanische Gummiwerke of Vienna. He continues his connection with Revertex, Ltd.—Dr. Gerald J. Cox, Mellon Inst. research worker, reports it is possible to strengthen mortar by as high as 60 per cent. through the addition of sugar.—Gen. Herman A. Metz's chemicals, paints and oils committee of the Federation for the Support of Jewish Philanthropic Societies (N. Y.) collected $71,546.—Edward Vleit of Frank-Vleit Co., gum importers, seriously injured in motor accident.—Jasper E. Crane, du Pont vice-president and director, took company executives inspecting through Waynesboro rayon plant.—4,500 letters of appeal from N. Y. Committee Relief for Chemists drew less than 400 responses, pledging $8,131, of which $4,883 is cash.—McNair of McNair-Dorland spoke before the Procurment Section of the C-W-S Reserve, 2nd Corp. Area, Feb. 6.—Roscoe C. Edlund, (Soap and Glycerine Producers) and Charles J. Brand, (Fertilizer) are on the trade association subcommittee of the national Share-the-Work movement.—Francis P. Garvan presented 2,000 rare volumes on Ireland to the Yale School of the Fine Arts.—Douglas Smyth, export manager with Chipman Engineering severed his connection.—John D. Ross, formerly with General Chemical is now vice-president in charge of traffic for W. E. Hedger Transportation.—The Fred L. Lavanburg Homes, model tenament in N. Y. City, is beginning its sixth successful year.—Du Pont common stock holders increased 19.6 per cent. during 1932.



U. S. I's Glens Haskell
New Alcohol Institute Head

G. O. Cume, Carbide & Carbon Chemicals vice-president, chief chemist, director of research, famous for his work in synthetics, is 1933 Chandler medalist.

Heavy Chemicals

Sulfur in 1932

Output of sulfur in U. S. in 1932 dropped to less than one half of the quantity produced in 1931. Shipments and exports showed smaller decreases than production, and stocks were reduced. Sulfur production amounted to 889,695 long tons in 1932, a decrease of 58 per cent., compared with the output in 1931 of 2,128,930 tons. Amount produced in 1932 was 1,669,286 tons, or 65 per cent., less than that reported in 1930, the record year. Shipments declined from 1,376,526 tons, valued at about $24,800,000 in 1931, to 1,108,112 tons, valued at about $19,900,000 in 1932, or over 19 per cent. in both quantity and value. Stocks at the mines on Dec. 31, 1932, had decreased to 3,031,000 tons, or 219,000 tons below the record reserve at the close of the preceding year.

New property of the Jefferson Lake Oil Company, Inc., in Iberia Parish, Louisiana, was put into operation the latter part of October. A production of 13,401 long tons was reported by this company by this company, but no shipments were made.

Jefferson Lake Oil (Pres. Arthur Barba turning first spade of earth) broke ground on Oct. 28, 1931; produced 13,000 tons in 1932; and started shipping in the past month.

Texas Output

Most of the output in 1932 was mined in Texas, and from this State has come virtually all of the production of recent years. Texas produced 876,294 tons of sulfur in 1932, or 98 per cent. of the country's total. Properties that contributed to this production were those of Duval Texas Sulphur at Palangana Dome, Benavides, Duval County; Freeport Sulphur at Bryan and Hoskins Mounds, Freeport, Brazoria County; and Texas Gulf Sulphur at Long Point Dome, Long Point, Ft. Bend County, Big Hill Dome, Gulf, Matagorda County, and at Boling Dome, Newgulf, Wharton County.

Exports of sulfur or brimstone in 1932 totaled 351,509 long tons, compared with 407,586 tons in 1931, a decrease of 14 per cent. Exports to all the countries that receive inportant quantities of American sulfur, with the exception of those to Australia and New Zealand, showed decreases. Canada received 95,800 tons in 1932, compared with 111,958 tons in 1931; Australia, 60,809 tons, compared with 21-362 tons; France 60,591 tons, compared with 73,457 tons; New Zealand, 32,553 tons, compared with 17,093 tons; Germany, 31,275 tons, compared with 82,218 tons; United Kingdom, 18,129 tons, compared with 23,635 tons; and Netherlands, 13,959 tons, compared with 20,524 tons. European countries received 37 per cent. of the total quantity exported in 1932, compared with 53 per cent. in 1931. Exports of crushed, ground, refined, sublimed and flowers of sulfur in 1932 were 16,285,095 pounds, a decrease from 27,197, 699 pounds in 1931. The principal importing countries were Canada with 4,800, 282 pounds; Australia, 2,458,844 pounds; Mexico, 1,469,069 pounds; United Kingdom, 1,168,437 pounds; and Brazil, 1,131, 117 pounds.

Feldspar Specifications

When classification for feldspar (CS23-30) was drawn up it was realized that there might be points which would need revision from time to time, so provision was made for annual meetings to consider recommendations for revision. Majority of consumers and producers of feldspar accepted this standard when it became effective on Sept. 1, 1930.

Several questions have been raised during first year and a half of operation of the Commercial Standard. Committee will welcome suggestions concerning standard and will be glad to offer explanation of any points in the standard which are not clearly understood. Standards Committee, American Ceramic Society, has requested that feldspar be included in 1933 report of the committee. CHEMICAL MARKETS (Jan. 1931, p. 34) contained a Survey of the feldspar industry, under title "The Most Common American Mineral," in which the classification was discussed in detail.

U. S. Customs Court holds, in case brought before it by Mefford Chemical, Los Angeles, that tannic acid powder for the use of tanners, and not medicinal, is dutiable at 11 cent rate.

New lactic acid factory is to be erected in Schilkowsk District by the Moscow Fermentation Trust. Plant is to have a capacity of 500 tons of 50 per cent. acid per year. Raw material is to be waste liquor of the starch industry worked up by a process that has been elaborated by Prof. Schaposchnikow.

Cuprous oxide or red oxide of copper is being advocated by Dr. J. G. Horsfall, N. Y. State Agricultural Experiment Station, Geneva, for alleviate disease known as damping-off, particularly in greenhouses. In Italy a copper chloride with copper content of 16.5 per cent., is being popularized under name "Caffaro Powder," by Societa Elettrica ed Elettrochemica Caffroa. Product is said to have certain advantages over blue vitriol and to sell for 10 to 15 per cent. less.

Chlorate of soda production of 3,000 tons annually is being considered by the agricultural department of New Zealand.

No justification exists for issuing an antidumping order against ammonium carbonate from England and Scotland, the Secretary of the Treasury decided Jan. 5. Prices quoted recently on imported material are said to have brought about the request for the order.

New Acetic Anhydride Process

Courtaulds, Ltd., has taken out a patent covering process for production of acetic anhydride by allowing acetic acid vapor to pass through a bath of molten metal, the surface of which is covered with a layer of some suitable catalyst. Lead, zinc, or an alloy of these metals may be used. Metal is melted in a graphite crucible, and the surface of the melt is covered with titanium dioxide, aluminum oxide, or other catalyst. Vapor issuing from the metal is condensed, and the anhydride separated in any known manner.

Powdered Oxygen

Commercial oxygen in the form of powder instead of a gas is being offered by subsidiary company of the I. G., Griesogen G.m.b.H., of Griesheim. Powder is marketed in metal containers which are airtight, and is said to effect considerable savings in the cost of transportation where oxy-acetylene welding work is to be performed.

To convert the powder into gas it is only necessary to pour it into a horizontal retort and ignite it. Liberation of oxygen follows immediately, and one kilogram of powder, which is to be marketed under the name of oxygal, produces about 300 litres of gas. Griesogen also has perfected a portable oxygen producer in which gas can be produced under this method at a pressure of 15 atmospheres. Producer is equipped with two retorts, permitting uninterrupted production of oxygen.

International Carbonic Engineering, Kennett Square, Pa., is making plans to manufacture its Carba refrigerator which uses "dry ice" for cooling. It is said that 20 pounds of "dry ice" will last a week. Price of unit will range from $40 to $80, it is stated.

Representative W. O. Reed has introduced a bill in Texas legislature which would increase production tax on sulfur to $1.50 a ton from 75 cents.

New process for preservation of wood has recently been developed as a result of work at Forest Research Institute at Dehra Dun, India. It has been found that while arsenic and chromium compounds applied separately for impregnating wood are soon washed out, when used together they are retained by the wood for much longer periods, and such a mixture is very efficient in preventing attacks of wood fungi and insects.

George W. O'Keeffe, Arthur Wright & Associates, filtration engineers, writes in January *Ceramic Industry* on "Filtering and Drying Raw Clay."

No estimates of German production of sodium peroxide are available, but three firms are engaged in its manufacture from metallic sodium, and capacity for production of metallic sodium is now privately estimated at 10,000 tons.

Joseph Turner & Co. has been appointed exclusive sales agent in the East for Colonial Salt of Akron, Ohio.

Richard N. Statham has joined staff of Chicago office of Industrial Chemical Sales. Mr. Statham was employed at company's laboratory Covington, Va., plant, before becoming affiliated with Chicago office. He is the son of Noel Statham, president of Industrial Chemical Sales.

International Selling is now exclusive selling agents for Coigent Chemical Products manufacturers of phosphorous, glues and gelatines. Business will be conducted as a new department of International Selling Corp. under supervision of W. E. Miller, former general representative of Coignet Chemical Products, whose entire New York organization will merge with International Selling. The latter company is also exclusive selling agent of Potasas Ibericas S. A., new Spanish potash salts producer. International Selling moved Feb. 4, to larger quarters at 70 Pine st., N. Y. City.

U. S. was the source of supply of the 100 cwt. of potassium bichromate imported into Great Britain and Northern Ireland in November. Month's import of sodium bichromate was 1,538 cwt., valued at £1,958. Of this total Russian material amounted to 492 cwt., worth £739, the balance in the month's supplies coming entirely from Germany.

Yocum Faust, Ltd., London, Ontario (Canada) has rebuilt and expanded plant for production of liquid sodium bisulfite.

Zinc Chloride in Refining

Although liquid zinc chloride has long been known as a refining agent for cracked petroleum fractions, its employment in the solid form is thought to be new in a new Russian process.

On their way to the rectifying columns the cracked vapours are passed through towers filled with zinc chloride supported on a porous material such as pumice stone or coke. The support is first impregnated with zinc chloride by moistening with a solution of the salt and drying at 150-200° C. Contact for a few seconds is said to suffice for purification at 250° C., owing presumably to the catalytic effect of the zinc oxide produced at this temperature. Regeneration of the zinc chloride is easily effected by successive washing in water and boiling, when the loss only amounts to 0.2 per cent.

Compania Manufacturera de Papeles y Cartones, Santiago, Chile's most modern and important paper manufacturing concern, is erecting at Puente Alto, 10 miles from Santiago, plant for conversion of 50 metric tons daily of wheat straw into bleached pulp by the Pomilio chlorine process. Umberto Pomilio, is personally supervising erection.

Sulfur extraction plant of Orkla Gruber, Norway, is reported to have produced 60,000 tons of pure sulfur in 1932, of which Sweden and Finland have each taken 20,000 tons, remainder being divided between Norway and the Continent. Copper sulfate production in Italy amounted to 749,963 quintals in first nine months of 1932. This total was 23 per cent. larger than that for the corresponding period in 1931.

A new method for producing anhydrous aluminum chloride is elaborated on in "Nowosti Techniki" (Soviet).

Chlorination of clay or bauxite proceeds exothermically when a cold mixture of carbon monoxide and chlorine is passed over the raw material at a low red heat. Hot producer gases are employed for the initial heating and the optimum temperature of 900° C. is later maintained by continuous removal of the finished product and simultaneous introduction of fresh raw material. Starting with china clay, a somewhat higher optimum temperature is indicated—1,000° to 1,050° C.

William Franklin Edwards, 76, director of research for U. S. Testing Co. of N. Y. since 1918, died at his home in Englewood, N. J. on Jan. 12.

Plastics

Watching Carefully

Said Dr. A. V. Bleinenger, Homer, Laughley China Co., speaking before recent convention of the U. S. Potters' Association in Washington:

"It behooves the pottery industry," to keep abreast of the developments in the field of synthetic plastics, such as the phenol-formaldehyde compounds ("Bakelite," etc.), so that it may recognize their shortcomings and counteract false claims made for these competitive products."

During 12 months ended November, 1932, Canada imported $2,711,598 worth of cellulose products, compared with $2,420,448 in the 12 month period ended Nov. 1931. U. S. supplied $2,19,626 of the former figure and $2,059,227 of the latter, most of the remainder coming from the United Kingdom. Celluloid in sheets and other forms comprised $1,215,436 of the total imports in the 12 months ended November, 1932, and $1,458,127 in the same period ended November, 1931.

A hard insulating material similar to Bakelite is now being manufactured in Bombay at the Indian Electrical Accessories Press Works under the direction of a German engineer named Gorris. At present process is being worked on a very small scale, but it appears to have considerable possibilities.

As a result of increasing demand, and because of the request of the Polish government, Fabryka Kabli, Krakow, has started production of a phenol-formaldehyde type of synthetic resin. Present domestic requirements are said to aggregate 150 to 200 metric tons annually.

Nobel & Co.'s plant at Troisdorf near Cologne, now producing pyroxylin and other plastics, has added 600 workers to its staff and has gone on a 24 hour per week employment.

Rubber Molding

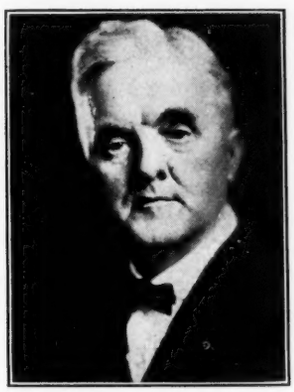
A different idea in rubber manufacture, a pure pale crepe suitable for molding into dishes, glasses and a wide description of household utensils, has been placed on the market by Goodrich. Rubber product is said to be "unbreakable," to possess unusual heat-resisting qualities for such a material and that it can be produced at low cost.

In addition to the usual lines of kitchen aids, sundry novelties and laminated goods, makers of Plioform compound have found excellent possibilities for it in the molded electrical parts field due to fine non-conductive qualities which make it especially suitable for parts such as radio tube bases. Goodyear will not manufacture molded goods but will supply the Plioform resin.

Fertilizers

Power or Nitrate?

The place—Muscle Shoals; the date—Jan. 21; President-elect Roosevelt, inspecting power and nitrogen producing facilities at America's prize $150,000,000 "white elephant," watching many thousands of gallons of water pouring unused through the spillways of Wilson Dam,



Senator George W. Norris
"Mr. President, I see my dreams come true"

turned to white-haired Senator George W. Norris, "This should be a happy day for you, George." With tears in his eyes the veteran Nebraskan replied, a bit huskily, "It is, Mr. President, I see my dreams come true."

Fertilizer industry, nervous over the President-elect's intentions, found no sedative in Mr. Roosevelt's impromptu remarks to wildly applauding audiences. For example:—"My friends and neighbors . . . Muscle Shoals is more than an opportunity to do a good turn for the people of one or two states. It is an opportunity to do a great deal for the people of many states and the whole country by tying industry, agriculture, forestry and flood control in one great development and so afford a better place for millions yet unborn in the days to come."

Fertilizer executives, while readily admitting the President-elect's remarks were couched in very general terms, and did not pledge specific course of action, are nevertheless, apprehensive. They point out that if Mr. Roosevelt was vague, Messrs. Norris, Hill, etc., would be painfully definite in legislation introduced.

N. F. A. Attacks

The N. F. A., fighting to prevent either government operated or government subsidized nitrogen production at Muscle Shoals, fired two broadsides for general press consumption, and timed the statements to come out simultaneously with the news-reports of Mr. Roosevelt's visit. The obsolescence of the nitrogen plants was stressed. As authority for several of the statements made, Secretary Charles J. Brand turned to the recently greatly debated Chemical Foundation Report of Columbia's Enrique Zanetti.

"Barrage of Propaganda"

Statistics were given, with which the fertilizer and chemical industries are already familiar. The Jan. 20 release closes with the following summary:

"Any one interested in the true facts must arrive at the conclusion that Plant No. 1 is useless and Plant No. 2 is thoroughly obsolete. This is the conclusion that has been reached by every competent chemical engineer who has had occasion to express himself during the past five or ten years. Mr. Roosevelt's desire to obtain correct and first-hand information concerning Muscle Shoals is highly commendable. It is to be hoped that he will be able to separate the true facts from the barrage of propaganda which is being thrown about him."

While a large number in the fertilizer industry were inclined to take a pessimistic viewpoint, some were more hopeful. *N. Y. Journal of Commerce*, inclining to this line of thought, in an editorial Jan. 26 stated: " . . . if the correspondents who accompanied Governor Roosevelt's party to the Shoals last week correctly interpreted the Senator's views: 'He now believes that they should be run as government experimental stations for the manufacture of fertilizers, as some more economical process for the manufacture of nitrate may exist or be devised.'" There will not be any let-down, however, to the industry's work of attempting to frustrate any bill likely to bring about either direct or subsidized government operation of Plants 1 and 2.

On Jan. 23 Senator Norris, returning from the Muscle Shoals trip, stated to a member of the United Press, "I shall introduce a government operation bill on the first day of the special sesion after March 4." He did not elaborate on this statement, and, whether or not operation of the nitrate and cyanamid plants is still part of his plan, the Nebraskan Senator failed to make clear.

Phosphate Rock Controversy

Standard Wholesale Phosphate and Acid, Baltimore, struck back at Phosphates Recovery Corp., I. A. C., and Cyanamid on Jan. 19 when it entered a flat denial before the Tariff Commission that it is importing Russian phosphate rock in unfair competition with U. S. producers. Complaining companies filed protest with the Commission in December.

Standard says in its answer that it has no knowledge as to most of the allegations in complaint and leaves petitioners to prove them. Domestic concerns charged that their patents for phosphate rock flotation process are being infringed by Soviet chemical trust which is exporting the rock. In its answer Standard denies that it has contracted to purchase 25,000 tons of Russian apatite or that 7,000 tons has been received, and says that it does not know whether United Chemical Industries of U. S. S. R. produces apatite or uses a process similar to that of the domestic companies.

The high percentage of fertilizer cost involved in transportation charges and the growing demand for concentrated fertilizer makes it necessary for fertilizer producers to use high analysis materials, Standard company maintains in its answer. For this reason manufacturers have for many years imported from Europe precipitated bone phosphate to supplement American phosphate rock, as Florida rock contains only 68 to 70 per cent. bone phosphate of lime, or 34 to 35 per cent. available phosphoric acid.

Prices Given

Standard states that it had a contract to purchase, during 1932, 1,000 short tons of precipitated bicalcic phosphate from Belgium, containing 38 to 42 per cent. available phosphoric acid, at 55 cents per unit, c. i. f. Baltimore, but later was approached by H. J. Baker & Bro., with offer of crude material which could be manufactured with American labor into an article comparable with the Belgian manufactured product at about the same price. Standard cancelled its Belgian contract, it is stated, and purchased from Amtorg cargo of Russian apatite containing from 80 to 86 per cent. bone phosphate of lime, which is equivalent to from 40 to 43 per cent. available phosphoric acid. This contract with Amtorg, dated July 22, 1932, is considered confidential by Standard but the commission is offered an opportunity to examine it privately.

Answer emphasizes that apatite is a crude material processed in this country and displaces a finished product formerly imported, and it is stated that Russian product is heavier than either the Florida rock or the European bone phosphate and the phosphate is more tightly bound chemically than in the others and therefore requires a longer and more expensive manufacturing process which has required employment of 40 additional men.

Soviet Retort

Amtorg Trading (Russian commercial agency in this country) on Jan. 23 also filed a further reply to the Tariff Commission's investigation of unfair competition in importing Russian phosphate or apatite, supplementing reply of Standard Wholesale Phosphate & Acid. Amtorg, denies that process of producing apatite in Russia infringes American patents as charged in the application for the investi-

gation, and asks that the case be dismissed.

Further Statements

Answer attacks complaint because the applicants, are not shown to be the owners of the patents involved, and, if they are only licensees it is asserted, they cannot prosecute infringement claims. A comparison of imports with domestic consumption was also made intending to show that the quantity brought in was insignificant when compared with the consumption of 3,000,000 tons of rock in 1931.

Alabama Registration

Bill which has been passed by Alabama Legislature and approved by Governor Miller, requires fertilizer dealers in that state to register with state commissioner of agriculture. They must also furnish names of any manufacturers represented, together with samples of the fertilizer to be sold.

Each sample is to be accompanied by an analysis, accurate within ten per cent., showing content of phosphoric acid, nitrogen and potash. Nitrogen may be grouped into organic and inorganic sources. It is also required that samples of filler be submitted for analysis by all companies doing business in Alabama. This material does not have to be declared on the registration tag, providing analysis shows it to be of recognized plant food value.

Southland Guano Co. has been incorporated in Greensboro, N. C., with a capital stock of $100,000, by E. G. West, 310 Murray st., Gaston W. Stanford and John B. Pleasants.

Eastern States Farmers' Exchange, Springfield, Mass., recently acquired Triangle Agricultural Corp., Wilmington, Del. Triangle was founded some years ago by C. C. Smith, now of N. V. Potash.

Georgia Freight Rates

Emergency railroad freight charge on intra-state shipments of fertilizer in Georgia has been abolished, effective Jan. 25, by the Georgia P. S. C. Charge, amounting in some instances to 20 cents a ton, was added to regular rates, with consent of the S. P. S. C. after its establishment in 1931 by the Federal I. C. C.

Julian Y. Williams, Atlanta manager for Georgia division, A. A. C., became assistant treasurer Jan. 1, with headquarters at N. Y. City. Hope S. Wofford, assistant manager at Atlanta, succeeds Mr. Williams.

Nitrate stocks at present held in Chile amount to 2,800,000 tons, according to results of an authorized survey.

Standard Wholesale Phosphate & Acid Works, Baltimore, has adopted a spread-the-work plan which has made possible employment of 400 additional workers and doubling number previously employed.

Carloadings

Southeast Shippers Advisory Board, car service division, American Railway Association, reports that 29,367 carloads of fertilizer were shipped during first quarter of 1932, and Board estimates that 27,400 cars will be needed for first quarter of 1933. This would mean a decrease of 1,967 cars, or seven per cent.

N. Y. State Agricultural Experiment Station, Geneva, is distributing free circular "Commercial Fertilizers for Grapes."

G. C. Metcalfe has been named representative in Bartow, Fla., for West Coast Fertilizers, Tampa, Fla.

William J. Webster, 86, prominent Columbia Tennessee attorney, and closely connected with the Tennessee phosphate industry since their discovery in 1893, died Jan. 16.

Acme Manufacturing, Wilmington, N. C., will soon begin operating chambers for production of sulfuric acid to be used in preparing superphosphate for fertilizers.

Southern Plant Food Corp., has been chartered in Jacksonville, Fla., by C. L. Black, 1352 Avondale ave., and others.

Societe la Nitrogene of La Roche-de-Rame (France) is producing calcium nitrate by direct combination of nitrogen oxides with completely anhydrous quicklime at 250-300 deg. C. Nitrogen oxides are initially produced by the arc process using oxygen-enriched air.

New Arrivals Feted

Armour Fertilizer officers were honored at a luncheon given Jan. 20 by the Atlanta Chamber of Commerce. John E. Sanford, Armour president, was the principal speaker Clark Howell, editor of *The Constitution*, who spoke following Mr. Sanford's talk, told of Atlanta's strategic position. Lee Ashcraft, president, Ashcraft-Wilkinson, presided.

John L. Heilig, well known in southern fertilizer trade, has opened office in New Monroe Bldg., Norfolk, Va., where he will handle on a brokerage basis, all fertilizer materials and chemicals.

I. C. C.'s hearings on the subject of rates on fertilizers and fertilizer materials between southern points, which had been set for Jan. 16, has been postponed to a date which will be announced later.

Briefly

V-C's consolidated offices in Baltimore are now under the management of C. F. Sims, vice-president.—*Commercial Fertilizer* has purchased and absorbed *Fertilizer Green Book* of Chicago.—Katsurago Maru, Japanese boat, 10,000 tons capacity, loaded Atmospheric Nitrogen's nitrate for Japan during the month.—Seventeen agents and dealers, representing 13 fertilizer producing companies were ordered to appear before the Georgia State Agriculture Department on Jan. 24 and 25, charged with marketing of chemical fertilizer brands not containing minimum standards for plant food.—Recommendation that a subsidy of £1 a ton be paid on superphosphate used in the 1932-1933 season is contained in the report on the superphosphate industry of Australia, prepared by the development branch of the Prime Minister's department. Recommendation would entail expenditure of £1,000,000. Copies of the report have been printed.—London reports that Graflich Schaffgotsche Werke is about to put into operation the first cyanamid plant in Western Upper Silesia.—American Cyanamid reports tremendous interest in its new cyanamid in pellet form.—During the past year more than 2,500 tons of granular material were supplied for actual field testing.—Productive capacity of French Government's Toulouse nitrogen plant is 40,000 metric tons. Output in 1931 totaled 24,278 tons.—On Jan. 1 W. R. Crum and Lewis Crum dissolved the firm of W. R. Crum & Co., Savannah. Lewis Crum is continuing in business under its own name.—Italian production of superphosphate during first nine months of 1932 totaled 472,371 metric tons, decline of 25 per cent., as compared with production for corresponding period of 1931.

W. H. Fry Dies

Chemical industry was shocked to learn of the death of W. H. Fry, 44, research chemist of the Bureau of Chemistry and Soils.—Export of phosphates from French zone in Morocco during 1932 amounted to 987,317 tons, compared with 900,731 in 1931.—Superphosphate fertilizers have been placed under a license system of import control by Lithuania.—Potash prices have been reduced 15 per cent. in Poland by Towarzystwo Eksploatacji Potasowych. This is the second reduction, aggregating 23 per cent., since Nov. 1, 1932.—Shipment of 3,500 tons of ammonium sulfate from Warfield plant of Consolidated Mining & Smelting, Trail, British Columbia, was recently sent forward to Hawaii.—Nitrogen production is planned by Yahagi Power Company, in Japan, through a recently organized subsidiary, Yahagi Nitrogenous Fertilizer, capitalized at 3,300,000 yen. Plant will probably be built at Nagoya and will have an annual capacity of 5,000 tons of nitric acid and 20,000 tons of sulfate of ammonia.

Fine Chemicals

Firm Formaldehyde Prices

Chemical Trade Journal (London) recently devoted quite a little editorial space to a discussion of the strength of the formaldehyde market and to possible direct syntheses. The market in this country has been firm and unchanged for sometime, quite similar to existing conditions abroad. Says the *Journal* in part:

"The strength of the formaldehyde market during the past few months argues that this at least is not numbered in the formidable list of chemical products, world production of which greatly outweighs demand. The manufacture of formaldehyde by the catalytic oxidation of methyl alcohol, although quite simply in theory, is in practice found difficult to control, and one in which unless a detailed study of all the factors concerned is first made is likely to produce uneconomic yields. These practical difficulties may have been partially responsible for the headway still maintained by consumption over production in the formaldehyde market, although the rapidity with which the industrial uses of formaldehyde are expanding is probably the predominating factor in the situation."

Camphor Receipts

Japanese government camphor monopoly bureau, in 1932, accepted from producers 4,500,000 kin of camphor according to reports from Japan. This is a considerable reduction as compared with total 1931 deliveries of 5,280,000 kin and the 1930 total of 5,500,000 kin. Reduced requirement is said to have resulted in abandonment of a number of camphor stills.

Method of Recovery

German chemist has recently perfected method for recovering camphor from waste celluloid which, it is claimed, retrieves 40 to 45 per cent. of the original camphor content. Validity of claims has not been fully demonstrated. Patents have been applied for in Germany and other principal industrial countries. Cost of plant with daily output of 600 kilos is estimated to be $714. Cost of reclaimed camphor is said to be 39 cents per kilo. Residue left after the extraction of camphor is asserted to be useful as a fertilizer. It is claimed that between 30,000 and 40,000 kilos of celluloid waste is available monthly in Germany at an average price of 75 cents per kilo.

Bismuth Production

Estimates that have been published of world production of bismuth vary between 300 and 900 tons. It is probable that higher figure includes ores and concentrates, and that so far as bismuth metal is concerned a figure of about 400 tons a year in normal times represents a close approximation to actual position. In recent years world consumption of bismuth has been only about 300 tons, so that stocks at mines and refineries are increasing.

Dronberger Dies

LeDru Rollin Dronberger, 83, central western representative for Mallinckrodt for over 32 years, died Dec. 29 at the Mansfield General Hospital, Mansfield, Ohio. Mr. Dronberger was active in business up to two or three days before his death. He was perhaps the oldest traveling salesman in the drug and chemical business.

Pfizer's monthly price list for February shows three declines and no advances.

Cheney Chemicals, Ltd., manufacturer of nitrous oxide, completed addition to plant at 180 Duke st., Toronto.

Abbott Laboratories' officials at a meeting of district and branch managers outlined a three-year program of expansion which provides for an immediate increase in company's sales staff. Sales volume and profits in December were the best for the company in past five years.

Seydel Chemical is abandoning the Nitro, W. Va. plant and concentrating activities at Jersey City.

Citrate of Lime Deposits

From closing of fiscal year in October until December, no deposits of new citrate of lime were accepted by Italian Camera Agrumaria. Stocks on deposit Oct. 31, according to figures given by the camera itself, amounted to 8,246,478 kilos. During the season from Dec. 1, 1931, to Oct. 31, 1932, deposits totaled 1,675,736 kilos; sales in the same period amounted to 764,564 kilos.

New Musk

Givaudan-Delawanna, has completed new artificial musk for perfumers and soap manufacturers. "Moskene" is said to have an odor that can be readily appreciated, but not too distant from either the ambrette or ketone.

Gums, Waxes, Shellac

Wax Importers Elect

A. H. Hoffman, Strohmeyer & Arpe was re-elected president, N. Y. Wax Importers Association at its annual meeting held last month. Other officers re-elected were W. F. Leary, Jacob & Allison, vice president; Charles Christman, Smith & Nichols, secretary, and R. Seivert, Frank B. Ross, treasurer.

Gums shipments at Singapore during first nine months of 1932 were:—Imports, copal, 300 metric tons; dammar, 2,521 tons; benzoin, 1,037 tons; exports, copal, 389 tons; dammar, 4,342 tons; benzoin, 765 tons. U. S. took approximately 75 per cent. of the copal and 25 per cent. of the benzoin exported.

New Glyco Wax

"Emuwax" new water-dispersible wax recently introduced by Glyco Products of Brooklyn, N. Y., is arousing interest because of its great flexibility, light color and emulsifying properties. It is offered at a lower price than beeswax which it replaces in some cases.

Charge of misrepresenting its product is made in complaint issued Jan. 16 by Federal Trade Commission against Acme Shellac Products, Astoria, Long Island, New York.

Standardization varnish gums is to be pushed further in Dutch East Indies. Trade organization has asked government for a grant of 18,750 florins for one year's work of this sort and has requested a subsequent annual grant of 7,500 florins.

Shellac Importers Meet

Louis Gillespie, Gillespie, Rogers, Pyatt, was named president of the U. S. Shellac Importers' on Feb. 2. Philip N. Rowe was elected vice-president and L. W. Babbidge secretary; following were elected to the board of governors: James W. Byrnes; R. W. MacClintock; A. F. Lerden; William Zinseer and John R. Anderson.

Gum Exports

Total exports of gums from the Dutch East Indies during the first half of 1932 totaled 6,640 tons, as compared with 8,810 for the same part of last year, of which 2,039 and 3,529, respectively, went to U. S. Chief export was gum copal, which equaled 3,354 metric tons, against 4,844 a year ago, with the shipments to U. S. falling from 1,857 to 1,091 tons. Gum dammar exports totaled 1,578 metric tons, 903 to this country, during the first half of 1932, and 1,850 tons, 1,096 for U. S. in six months' period last year. The less important items showed similar declines.

Naval Stores

Danger

Naval stores industry fought during the month suggestion of placing five cents per pound duty on industrial oils and fats from countries other than the Philippines. It is feared that there would result a large increase in cocoanut oil imports and no rosin is used in soaps made from this oil. Members of the naval stores industry were urged by leading executives to write Washington representatives.

Litigation

Action for receivership brought against Lake Charles Naval Stores Co., by Anthony Vizard has been taken under advisement by Judge Boatner in Civil District Court in New Orleans. Canal Bank & Trust Co. was brought into the suit owing to the fact that it is acting as trustee for $1,123,000 in bonds for which stock of the Lake Charles company was pledged.

Half of the Lake Charles stock is owned by Gilican-Chipley Co., naval stores factors, and half by Anthony Vizard. Gillican-Chipley Co., early in 1926, issued $2,500,000 bonds, pledging stock of the Lake Charles Co. with the bank, which was subsequently reduced to $1,123,000. Witnesses testified Jan. 25 that several months before the suit was filed informal liquidation of the Lake Charles company was begun, and the plaintiff received $158,858. Bank contends that this was a loan and that one-half should be returned to Gillican-Chipley.

Exports

Exports for December shows total foreign movement 17,154 barrels of turpentine and 90,345 barrels of rosin. Of the turpentine 16,497 barrels were gum turpentine and 657 barrels were wood. Of rosin 76,420 barrels were gum, and 13,925 wood. The exports to all countries for the nine months of April-December were as follows:

Year	*Turpentine bbls.*	*Rosin bbls.*
1932	189,566	833,306
1931	214,098	855,412
1930	280,323	1,014,068
1929	299,656	1,112,905
1928	231,880	953,893

For the first eight months of 1932 total turpentine importation into Italy was 1,131,428 gallons. France and Spain were the important countries of origin, although U. S. shared in trade to extent of 135,142 gallons. U. S. has always been and continues to be one of the chief sources of supply of rosin. In 1931 out of a total of 232,000 quintals U. S. furnished 54,000 quintals and ranked in third position next to France and Greece.

December production of naval stores by steam distillation and solvent treatment of wood and stocks of these products on hand Dec. 31, according to data collected by producers' committee, through Arthur Langmeier, Hercules Powder secretary, were as follows:

Production

	Rosin 500-lb. bbls. barrels	Turpentine (50 gallons)	Pine oil Gallons
Month of Dec.	29,220	5,070	199,202
Total from Apr. 1, 1932	272,555	44,888	1,774,903

Stocks at Plants

Total, Dec. 31, 1932	100,053	13,112	.....
Mar. 31, 1932	90,540	5,835	.....
Change	+9,513	+7,277	.....

Note.—Rosin production and stocks include all grades of wood rosin.

Freight rates to Europe for naval stores were drastically cut in the last week of the month. Rosin rate to Great Britain and European ports was reduced to 25 cents per hundredweight. Rates on turpentine to these points was reduced to a flat rate of $2.50 per barrel.

Starks office of the Southern Forest Experiment Station was discontinued Jan. 1 and the personnel moved to Lake City, Fla., where Starke and Lake City offices were consolidated.

Lenthall Wyman is completing bulletin describing in detail later phases of Starke naval stores studies. This is intended to supplement Bulletin 298—"Experiments in Naval Stores Practice" published last spring.

Research

Explaining to appropriations committee work being done with its naval stores fund, Dr. Henry G. Knight, chief of the bureau of chemistry and soils, pointed out that these investigations are especially valuable in times of depression through their development of new markets. Said Dr. Knight:

"Recently there has been developed a compound of rosin with glycerine, which makes rosin a competitor of very finest copals. They are used for the very finest varnishes. That has opened up a new use for rosin, which has been of great benefit to the naval stores producers."

Prominent Italian firm, located in Rome, desires to negotiate for an agency for naval stores produced in U. S. Particulars may be obtained from the chemical division, Bureau of Foreign and Domestic Commerce, Washington. During the first eight months of 1932, Italy imported 1,131,428 gallons of turpentine, of which the U. S. supplied 135,142 gallons, and 145,500 quintals of rosin, of which U. S. supplied 50,000 quintals. France and Spain supply the greater part of the turpentine imported into Italy; France and Greece each share about equally with U. S. in the supply of rosin.

Cyanamid's Valdosta paper sizing rosin plant recently destroyed by fire is being rebuilt. An additional 10 acres of land have been purchased for storage facilities.

Spanish Exports

Total exports of turpentine and rosin from Spain during the first 10 months of 1932 suffered a decline. Turpentine shipments amounted to 167,818 gallons, as compared with 215,047 gallons for the same period of 1931. Italy was the largest purchaser, with Belgium and France following. Rosin shipments for the period totaled 1,321 metric tons which quantity represented a loss of 193 metric tons over the corresponding period of 1931. Great Britain, Germany and Belgium were the largest buyers.

Ready

Phoenix Naval Stores, recently incorporated in Mississippi, has completed reequipment with improved machinery and apparatus of the Gulfport, Mississippi plant purchased from Hercules Powder and will soon start regular production of wood rosin, steam distilled wood turpentine and pine oil. Company starts with a capital of $50,000 and an organization consisting of: J. D. Stuart, president; J. T. Latimer, vice president, in charge of operations; R. F. Anderson, vice president, in charge of operations; V. A. Anderson, treasurer; W. A. McInnes, secretary and manager.

J. C. Nash, Columbia Naval Stores president, is entirely recovered from his recent illness.

Edward Fielding, 94, veteran Canadian naval stores distributer, died at his home in Toronto, Jan. 14.

Savannah's new mayor is Thomas Gamble, well-known editor and publisher of *Weekly Naval Stores Review* and the *International Naval Stores Year Book*.

Harry G. Carpenter, Union Wadding Co., of Pawtucket, R. I. was in Savannah in the last week of the month.

W. C. Vereen was elected chairman of the board of the Downing Company, and Millard Reese was named president at annual meeting of company.

L. M. Williams, 61, prominent member of the naval stores industry for 40 years, died at Adel, Ga., Jan. 14.

Coal Tar Chemicals

Import Statistics

Imports of synthetic dyes into U. S. in December totaled 278,985 pounds and were valued at $287,251. These figures compare with 221,469 pounds, valued at $192,742, imported during the same month in 1931. Imports during 1932 amounted to 3,906,629 pounds, valued at $3,518,230; imports in 1931 were 4,735,972 pounds, valued at $4,099,164.

Origin

	Percentages December	
	1932	*1931*
Germany	61.33	78.00
Switzerland	38.13	18.47
England	.30	3.53
Others	.24	.....

Leading Dyes

	Pounds
Vat golden yellow GK double paste (single strength)	14,400
Formal fast black G conc	8,819
Trisulfon brown BP conc	7,265
Alizarin light blue B conc	5,434
Brilliant indigo 4G paste	4,737

Imports of aromatic chemicals during December totaled 2,991 pounds, were valued at $4,744; imports in the same month in 1931 amounted to 8,871 pounds, valued at $13,773. The total for 1932 is 62,241 pounds, valued at $128,884, compared with 67,438 pounds, valued at $104,962, in 1931.

Medicinals, photographic developers, intermediates, and other coaltar products amounting to 185,518 pounds and valued at $64,193 were imported in December, compared with 52,465 pounds of these products, valued at $42,127, during December, 1931. Imports in 1932 amounted to 1,414,173 pounds, valued at $704,017; imports in 1931 were 1,693,962 pounds, valued at $745,820.

Imports of color lakes during December amounted to 100 pounds (value not publishable). This brought total imports in 1932 to 14,356 pounds, compared with 9,309 pounds in 1931.

British Dyestuffs

Marked expansion in British dyestuffs industry since the passing of the Dyestuffs (import regulation) Act, 1920, is shown in a report of dyestuffs industry development committee just issued.

Output of dyestuffs, report reveals, advanced from 23,832,967 pounds in 1922 to 55,785,032 pounds in 1929, highest output recorded in any one year. Before the war Britain manufactured only 22 per cent. of the dyes used in this country; since 1928 the proportion has risen to between 90 and 93 per cent.

Continuation of the import regulation for another year was bitterly fought by consumers last December. As a compromise, regulation was extended for another 12 months, but a committee was appointed to investigate in detail the question, and to report to the Commons early this fall before the matter is again brought up. At that time it is expected that a determined effort will be made by the textile industry to end the 10 year protection given to English dyestuffs producers.

German Dye Exports

German exports of coal tar dyes showed marked improvement in September and October, 1932. Total shipments in the first ten months of the year were, however, 27 per cent. in value and 36 per cent. in volume below those in the corresponding period in 1931. Exports in the two periods compare in volume as follows:

	Tons	
	1932	*1931*
Alizarin, red	920	1,061
Alizarin, other	652	764
Anilin	18,976	26,861
Indigo	2,891	8,235
Totals	23,439	36,921
Total value (marks)	106,004,000	145,222,000

Marked decrease in exports of indigo was caused by heavy losses in trade with important markets of the Far East. Shipments of aniline dyes to China dropped from 8,248 tons in the 1931 period to 3,951 tons; shipments to British India dropped from 3,698 tons to 2,642 tons.

Following figures have been issued as representing output of benzol in various countries during 1931, latest year for which complete statistics are available:

	Tons
United States	420,000
Germany	260,000
United Kingdom	100,000
France	78,000
Belgium	35,000
Sarre	31,000
Czecho-Slovakia	26,000
Holland	22,000
Poland	19,000
Italy	5,000
Spain	3,700

1931 Production Data

Value of coal-tar products made for sale by manufacturers in the U.S. in the year 1931, according to a preliminary tabulation of data collected in the Census of Manufactures taken in 1932, amounted to $103,532,687 (at f. o. b. factory prices), a decrease of 20.8 per cent., as compared with $130,651,757 reported for 1929, last preceding census year. More important items which contributed to total for 1931 are as follows: Crudes, $20,641,540; intermediates, $16,907,349; dyes, $41,388,299; medicinals, $7,726,375; phenolic resins, $8,057,620.

Sherwin-Williams is producing special grade of beta-naphthol for use as a tanning antiseptic. In *Hide and Leather* (Jan. 14 issue) Dr. John A. Wilson, well-known leather chemist, contributed an article explaining "Beta naphthol as an Antiseptic in the Tannery."

German press reports existence of an international convention on creosote oil between Germany, France, England, Belgium and the Netherlands. Convention is believed designed to regulate prices, to control tonnage production and dispositions.

In this connection, it is also reported that the wish is expressed in certain quarters to extend this convention to include other products of coal-tar as road-tar, binder, pitch, anthracene, naphthalene, etc. Subject was brought up at a recent meeting of international interests at Brussels, but no progress was made toward affectuation.

Annual production of coal-tar creosote oil in Japan is reported to have totaled 20,598 tons valued at 1,082,762 yen during 1930 and to 22,000 tons valued at 1,200,000 yen during 1931. It is estimated that approximately 50 per cent. of this production was exported to foreign markets. (Average value of yen, 1930—$0.4839; 1931—$0.4885 U. S. currency.)

Cheaper Process

Pure carbazole is a rather expensive product to make due to poor yields and high working costs. Tar oils, particularly phenol-free creosote oil, are reported to be suitable for the economical purification of coal tar carbazole residues. An account of the process is given by Dr. E. Kenngott in "Chemiker-Zeitung," Dec. 7, 1932. Both the residues derived from the purification of crude anthracene with pyridine and those remaining after anthracene has been refined by the other well-known method of treatment with potassium carbazolate are readily amenable to creosote oil purification.

Crude product with dry content of 25 to 30 per cent. carbazole is heated for several hours at 130° C. with three times its weight of creosote oil, and the hot solution subsequently blown by compressed air into suitable iron or wooden tanks where coarse crystals of carbazole separate out. After cooling to 45° C. these are centrifuged to give a product containing 90 per cent. dry carbazole. By distillation with more creosote oil in a cast-iron retort equipped with heating coils, followed again by centrifugation, there results a dazzling white product of 94 per cent. carbazole content. Finally, carbazole of 98 to 99 per cent. purity, entirely free from anthracene, is obtained by dissolving the 94 per cent. material in solvent naphtha, solution being effected by stirring for several hours at 160° C. Not only are the last traces of creosote oil thereby removed but the subsequently crystalized mass is more readily dried. Most of the solvent used at this stage is recoverable while the creosote regenerated from the first two stages of purification can be directly applied to the impregnation of railway sleepers.

Textile Chemicals

Dyes Introduced

General Dyestuff is introducing Indanthren Brilliant Orange GR Suprafix (I. G.) It is valuable for printing fabrics of vegetable and artificial fibers. In shade, it lies between Indanthrene Brilliant Orange GK and RK, but is brighter than either of these. This dye is highly recommended for printing white and color discharge effects and for colored resist styles in the production of brilliant effects under Aniline Black and Indigosol dyeings. Fast Light Red 4B.A., a new acid dye of General Aniline and sold by General Dyestuff and produces a bluish red shade of very good fastness to light, dyes level and is recommended in combination with other colors for the production of mode shades on ladies' dress goods, carpet yarns, etc. Fastusol Red Violet RL is a new direct dyeing cotton color of the I. G. and dyes cotton, rayon and unweighted silk full bright violet shades which are clearer and redder than those obtained with Fastusol Red Violet BBL. It is particularly noticeable because of its excellent fastness to light and because of its level dyeing properties.

Benzo Viscose Blue BF produces bright, well covering light and deep shades of blue upon rayon of varying affinity. Alizarine Irisol RL, also an I. G. dye, a new wool violet, produces bright, clear, well covering reddish violet shades upon wool, pure silk and gloria. Its fastness to light is excellent and it possesses good fastness to rubbing, hot pressing and stoving and excellent fastness to carbonizing and decatizing. It is recommended for production of fast lilac and other violet shades on lightweight dress goods, upholstery and furnishing fabrics, hosiery yarn and carpet yarn where fastness to light is of primary importance. It may also be used for shading chrome dyed goods which need not be particularly fast to milling. It can also be used for direct printing on wool, unweighted and weighted silk.

Still Others

Sandoz Chemical is introducing two new dyes, Alizarine Light Violet 2RC, a wool dye, producing shades closely approaching those obtained by Alizarine Light Violet RS and particularly valuable for shading mordant colors, and Fast Silk Tellow GL, a new silk yellow. Bright greenish shades are produced upon both weighted and pure silk, while cotton, viscose and celanese effects are left white. Due to its solubility and fastness, it is well adapted as a printing color.

John Campbell also has brought out sulfur color, Amalthion Brilliant Cerise AD, which is not new, but which embodies distinct improvements in manufacture over older types. Color is unusually brilliant, even for a sulfur dye, and is suitable for cotton and rayon goods where more than ordinary brilliance of shade is desired. Formadine Black DG extra, corresponding to the imported Formal Blacks, is also being produced in the Newark factory of John Campbell & Co. Designation is well known in the trade and is particularly suitable for the dyeing of hosiery, for cotton goods, silk, and most descriptions of rayon.

I. G. Sample Card

New sample card, issued by I. G. and distributed by General Dyestuffs, contains 21 print effects produced by a number of the Rapidogen series of dyes and also contains detailed recipes for the production of the illustrated effects, which are upon viscose-cotton and cotton piece goods. General Dyestuffs also calls attention to new sample card illustrating results obtained by a number of dyes manufactured by I. G. which are particularly suitable for producing white effects upon woolen and cotton mixed goods. Sandoz Chemical has issued new sample card showing discharge effects of Trisulfon Brown B, Trisulfon Brown BP, Trisulfon Brown O, Trisulfon Brown 2G and Trisulfon Brown 3R upon silk.

Titan Chemical Products, Inc., has been incorporated to manufacture and import full line of textile chemicals. Operations will be under direct supervision of H. J. Stulz, president, formerly connected for many years with H. A. Metz & Co., and Commonwealth Color & Chemical.

John Campbell & Co. to prevent all possibilities of confusion between its dyes and those of other manufacturers, has changed name of its Celacyl series of dyes to Camacyl Dyes.

W. H. Wood, who represented United Aniline Co. in New England territory, has resigned and is now associated with Textile Aniline & Chemical, Boston. Frank O'Hara now represents Nyanza Color & Chemical in New England.

Textile dyeing and finishing was the only branch of the industry to show an increase in employment in December, 1932, compared with November, according to indexes prepared by Philadelphia Federal Reserve Bank.

Textile Color Card Association has issued "Color Coordination Guide" to be used with 1933 "Spring season hosiery color card of America."

Domestic consumption of rayon in 1932 totaled 149,500,000 pounds, according to records compiled by Tubize Chatillon. Rayon production for 1932 totaled 131,000,000 pounds, which represents decline of 10 per cent. from total of 144,800,000 produced in 1931, due to sharp curtailment in operations last summer. Stock figures show that 1932 year-end inventories amount to only a three weeks' supply as against a normal seven weeks' supply at the end of 1931.

New Manufacturer

Young Aniline Works, Inc., which will manufacture and market synthetic dyestuffs, has been formed in Baltimore by J. S. Young Co. New company will concentrate on production of azo colors. It will distribute its products through recognized dealers in dyestuffs. Personnel of Young Aniline will include Arthur L. Benkert, Robert J. Grant, Edward Weston, and others formerly associated with Noil Chemical & Color. New corporation will have New York offices at 253 Broadway.

Association Meetings

January meeting, N. Y. Section, American Association of Textile Chemists and Colorists, was held at the Elm Golf Club in Paterson, N. J., Jan. 27. Speakers: Dr. H. D. W. Smith, A. M. Tenney Associates; whose subject was "Why is a Textile Fabric?" and Dr. Arthur E. Weber, National Aniline, whose subject was "The Influence of Direct Sunlight on Vat Colors in the Reduced State."

Textile Dyers Elect

National Association of Textile Dyers and Finishers met in Providence on Jan. 21. New officers elected for 1933: president, Michael Roberts, Rhode Island Worsted, vice-presidents, P. P. Charland, Franklin Mills; Armand Henault, Assawaga Co.; William Deady, Slatersville Finishing; John Cole, Wood Worsted, George Johnston, Service Dyeing; secretary, James C. Mitchell, Lippett Woolen; and treasurer, James Buchanan, Seekonk Lace Co.

Canadian Celanese Co., Ltd., has started new year with unfilled orders at a high level and plant continues to operate on a 24-hour basis.

American Aniline Products, N. Y. City, has issued four color cards for printers and converters. Cards comprise following data:—(1) Amanil colors on rayon with discharge, (2) developed colors on rayon with discharge, (3) Amaply colors for printing weighted silk, (4) Amanil-Amacid colors on tin-weighted silk.

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Paints, Lacquers and Varnish

1932 Casein Production

An Argentine trade association has estimated production of casein for 1932 at 12,000 metric tons. This compared with 16,000 for 1931. On the other hand, exports were put at approximately 17,000 metric tons, against 14,455 for previous year. Combined effect of lower production and larger consumption was to reduce stocks from 7,000 metric tons on Jan. 1, 1932, to an estimated level of 2,000 on Dec. 31. Decrease in production was attributed to closing down of many small plants and a smaller output by the large firms because of the low prices. Prices up to November were over 30 per cent. below 1931 levels, but during last two months of the year they showed a rather sharp advance. Germany, United Kingdom, Netherlands and Japan were by far the most important markets for Argentine casein during 1932.

National Lead is offering a complete line of colors in oil. These will be sold by liquid measure and will be packed in pints, quarts and gallons. At the same time company will place on the market liquid metallic driers, including lead, cobalt and manganese derivatives.

Atlantic branch of National Lead held its annual sales meeting at the New York offices on Jan. 16.

Norman W. Drescher, vice-president, Valentine & Co., who has, for many years, headed its trade sales division, has recently been elected vice-president Detroit Graphite, an affiliate, covering the industrial field.—Roxalin Flexible Lacquer Long Island City, N. Y., has elected Robert V. Kirk as secretary in recognition of his services as chief chemist. M. A. Dorian has been promoted to succeed Mr. Kirk as chief chemist.

Perspiration-proof Lacquer

Bell Telephone Labs., are reported to have developed a type of lacquer which is entirely resistant to perspiration. This overcomes the unpleasant tendency to wear off the surface in frequently used telephone instruments, which is due to the effect of human perspiration on oleic acids. The product was perfected after a long series of tests in conjunction with the Roxalin Flexible Lacquer Co. of Long Island.

Alton B. Brown, for several years president and a director of Peerless Carbon Black, Pittsburgh, died Jan. 17 at his home at Edgewood, Pa. He was also a director of Columbian Carbon.

Vitro Manufacturing, Pittsburgh, has developed a number of new products for the ceramic field. Vitro has been granted patent covering manufacture of vitrifiable cadmium-selenium colors, which gives them a full line of all shades and tints in glass colors. They have licensed R. &. H. and B. F. Drakenfeld to manufacture and sell colors covered by Vitro Patent U. S. 1,673,679.

Ceramic Color & Chemical has developed a line of vitrifiable glass colors to be used on all types of glassware to produce pastel and brilliant colors.

The 19th annual convention, National Association of Paint Distributors will open at the Drake, Chicago, Feb. 20.

Michael Doniger, formerly in charge of the laboratory of Titanium Pigment from late in 1927 until recently, is now president of Empire State Varnish, Brooklyn.

John N. Welter, 58, chairman of the Board, Pratt & Lambert, died unexpectedly Jan. 8 at his home in Evanston, Ill.

Summarized

H. D. McCrum, who has represented William Zinsser for over 13 years, is now connected with Twin City Shellac, Brooklyn, N. Y. L. R. Van Allen, Chicago, shellac and paint and varnish raw material representative, has moved his offices to 405 No. Wells st. after many years at 350 No. Clark st.—Charles Hoover is the new general superintendent of Sterling Paint Co. of Emeryville. A veteran paint superintendent on the Pacific coast, he was formerly with Patton Paint of Milwaukee.—Erik V. Meiden, 48, who was in charge of New York office of Imperial Color died suddenly Jan. 4, on reaching his home in Larchmont, N. Y.—Believing that a more optimistic feeling from a business standpoint is bound to result when money is received before actually due, National Manufacturing Corp., Tonawanda, N. Y., manufacturers of paint, varnish and roofing materials, on Dec. 29 sent checks in full payment of all accounts then outstanding on their books, regardless of the date when due.

Oils and Fats

Linseed Oil Hearings

Northwestern farmers and flaxseed crushers sought an increase on Jan. 17 in the differential between the duties on linseed oil and flaxseed, and demanded explanation why Dutch producers of linseed oil have refused to make known their costs before the Tariff Commission.

Representing domestic flaxseed producers in the northwest, Alva S. Benton, North Dakota Agricultural College, told the commission that domestic producers of flaxseed cake and linseed oil are suffering from the threat of depreciated currencies in foreign countries. He explained that domestic producers of seed have already been seriously hit by the depression, pointing out that the American crop in 1931 and 1932 was worth about $13,243,000 and $9,500,000 respectively, while several years previously it was worth from $40,000,000 to $50,000,000.

Asking commission to consider in its investigation the Pacific coast market, which accounts for 10 per cent. of the domestic consumption of linseed oil, J. D. Craig, Spencer Kellogg, explained that most oil consumed on the west coast is crushed in the northwest from domestic flaxseed and asserted that an insufficient differential between the duties on the seed and the oil would not protect this market for the domestic farmers and crushers. He pointed out that the I. C. C. has already approved increase on linseed oil freights from Minneapolis to Pacific coast ports and declared it is likely the railroads will put this increase into effect some time this year. Mr. Craig asked that no action be taken at this time toward reducing the duty on linseed oil.

Testimony during the hearing developed that the only country exporting linseed oil to U. S. which is now off the gold standard is Great Britain, but representatives of the domestic interests contended that Holland, which is the chief competing foreign country, has been affected by depreciated currencies in other European countries because it cannot sell its cake and oil there and will probably turn to us as an outlet for the latter.

In Philadelphia

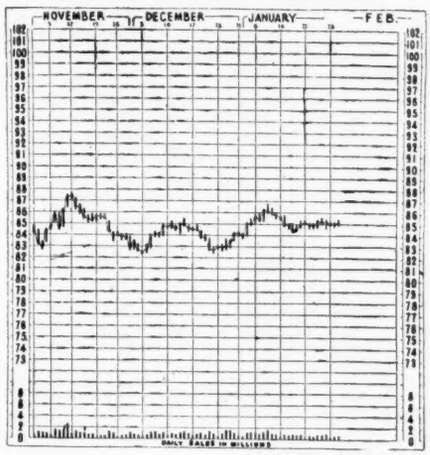
Walter F. Platt, Jr., formerly assistant manager, eastern sales division, Archer-Daniels-Midland, has opened an office for the same company in the Philadelphia Saving Fund Bldg., Philadelphia. In addition to Archer-Daniels-Midland linseed oils, Mr. Platt will be in charge of sales in Philadelphia and vicinity for Werner G. Smith Co., chinawood oil and fish oils; Cook Swan, whale, sperm and fish oils and kindred products, including spermaceti and hydrogenated (hardened) oils; William O. Goodrich Co., soya bean oil; and Wyandotte Oil & Fat Co., hydrogenated oils and synthetic stearic acid (double-pressed.)

The Financial Markets

A Professional Market

January stock market proceeded at a snail's pace. Movement was within a narrower area than in either of the two previous months. Trading was extremely dull, and the volume reflected the almost complete lack of interest of the general public. However, a ray of brightness was seen in the fact that for the second consecutive month stocks made a gain, albeit a

Daily Record of Stock Market Trend



N. Y. Herald Tribune

January stock movement was within a narrow range

very, very small one. Appreciation was the smallest for any month since August 1931. Based on the movement of 240 stocks in 20 groups, *N. Y. Times* estimated total appreciation at less than one per cent. In December chemical and public utility groups led the upswing. In January rails and tobacco stocks were the most conspicuous.

Reasons

The slow progress being made in Congress on important legislative matters, further talk of inflationary schemes of one kind or another, further outstanding reductions in dividends of "key" stocks, the uneasiness surrounding the foreign debt settlement, and the generally slow rate of recovery in business, were the major reasons for the uncertain state of the stock market.

First week of the month witnessed a strong tone in the market. This feeling was carried into the second week, but in the third, interest began to lag perceptibly, and prices went to lower levels. In the final week, the trend turned slightly upward again.

A Month of Advance

In only 15 months since the end of September, 1929, have gains been made in stock prices; four in 1930, five in 1931, five last year and one this year. Prices are now about 25 per cent. of what they were at the end of September, 1929.

The following table shows the changes in the 20 groups of the *N. Y. Times*.

	January, 1933	
Group and Number of Issues	*Avr. Net Ch'ge in Points*	*Change in Values*
Amusements (5)	1.350	— $12,162,621
Building equipment (9)	+ .361	— 2,739,556
Business equipment (4)	+ .904	+ 2,699,493
Chain stores (14)	— .884	— 36,024,701
Chemicals (9)	+ .292	+ 39,652,757
Coppers (15)	+ .150	— 1,604,178
Department stores (10)	— .638	— 8,867,938
Foods (19)	+ .572	— 4,081,427
Leathers (4)	+ 1.188	+ 1,741,160
Mail order (3)	+ .625	+ 7,713,864
Motors (15)	— .400	+ 5,988,825
Motor equipment (7)	— .178	1,386,889
Oils (22)	— .085	65,640,031
Public utilities (29)	+ .095	79,055,533
Railroads (25)	+ 2.535	+ 136,048,673
Railroad equipment (8)	+ 2.234	+ 28,750,246
Rubber (6)	+ .167	+ 230,408
Steels (13)	— .154	+ 7,566,135
Sugars (9)	+ 1.180	+ 7,087,581
Tobaccos (4)	+ 2.652	+ 74,921,367
Average and total 240 issues	+ .509	+ $100,837,635

Dividend Omissions

As the month closed two important dividend omissions were made; Standard of N. J. omitted usual extra dividend of 25 cents a share on the capital stock while paying the regular dividend of the same amount. Drug, Inc., changed from a $4 basis to $3. Annual reports of chemical companies, coming in rather slowly, show in most instances drastic declines in earnings in 1932 compared with 1931. However, in practically all cases, earnings in the last quarter were better than in the third quarter of 1932, and in a number, the final quarter earnings were the highest for the year. It is thought that chemical production in the first three months of this year will at least equal that in the December 1932 quarter.

The Chemical Group*

In the group of nine leading industrial chemical common stocks, seven appreciated and two, U. S. I. and V-C depreciated. The net loss in Alcohol for the month featured the chemical group and amounted to $2,243,064, the stock having a particularly bad break in the last week. The net gain of the chemical group of $39,652,757 in January compares with a loss of $76,262,096 in January 1932, and a gain of $108,715,501 in December. The net changes in total value in January 1933 follow:

	Gain	*Loss*
Allied Chemical & Dye	$8,104,347	.....
Commercial Solv. Corp.	3,479,112	.....
Davison Chemical Co.	315,042	.....
Du Pont de Nemours & Co.	22,131,366	.....
Mathieson Alkali Works.	.....	.....
Texas Gulf Sulphur	2,222,850	.....
Union Carbide & Carbon	5,763,376	.....
U. S. Industrial Alcohol	.....	$2,243,064
Virginia Carolina Chem.	.....	120,272
Total	$42,016,093	$2,363,336

Freeport Texas Offering

Freeport Texas Co. offered through Kidder, Peabody 25,000 shares of new 6 per cent. convertible preferred stock at $100 a share. New stock will be convertible into common stock for five years at $30 a share and for the succeeding five years at $40. Proceeds of the financing will be used for development of the company's new sulfur property. (CHEMICAL MARKETS, Dec., 1932, 534).

New preferred stock will be callable at 103. If it is retired before the first five-year conversion period, stockholders may retain warrants to purchase stock at $30 for the balance of the five-year period. Company is understood to have closed 1932 with $2,250,000 cash.

The offering of six per cent. preferred stock by Kidder, Peabody on Jan. 30 was oversubscribed by approximately twice the amount of the offering. At the close of the market Jan. 31 shares were quoted at 101 bid, a premium of one point above offering price.

Eugene L. Norton Says—

In remarks attached to annual report of Freeport Texas, President, Eugene L. Norton, says in part, "It is expected that approximately $3,000,000 will be spent on development of sulfur deposit at Grande Ecaille, Louisiana. Management feels that since earnings have been maintained at a level in excess of $2 dividend requirements, stockholders are entitled to their customary rate. In order to provide funds for development of the new plant

*Chemical stock values, as compiled by N. Y. Stock Exchange, declined $35,672,104 in January. Average value declined to $27.64 from $28.18.

Price Trend of Chemical Company Stocks

	Dec. 31	*Jan. 7*	*Jan. 14*	*Jan. 21*	*Jan. 28*	*Net Change*
Allied Chemical	83 1/8	87 1/2	87 5/8	86 5/8	86 1/4	+3 1/8
Air Reduction	60	61	62	60 1/2	59 1/4	— 3/4
Anaconda	7 1/8	8 3/8	7 7/8	7 5/8	7 5/8	+ 1/2
Columbia Carbon	29	32 3/8	34 5/8	33	34	+5
Com. Sol	10 1/4	11 1/8	11 7/8	11 3/4	11 5/8	+1 3/8
DuPont	37 3/8	39	40	40	40 1/8	+2 3/4
Mathieson	14 1/2	16 1/2	17 1/8	16	16	+1 1/2
Monsanto	27 1/2	28 3/8	29 1/2	28 3/4	30	+2 1/2
Std. N. J.	30 3/4	30 3/4	31 1/4	30 3/8	29 7/8	— 7/8
Texas Gulf	22 1/2	23 3/8	24 1/8	24	23	+ 1/2
U. S. I.	25 3/4	26 5/8	26 1/2	25 3/4	20	—5 3/4

without taking them from stockholders by reducing the dividend it was decided to offer publicly $2,500,000 6% cumulative convertible preferred. A special meeting of the stockholders has been called for Feb. 20 to authorize this. Par value of common will be changed to $10 from no par.

"Directors have recommended that authorized common stock be increased by 118,000 shares to provide for conversion privileges of the preferred which may be converted at $30 a share until Feb. 1, 1938, and thereafter at $40 a share until Feb. 1, 1945.

"During the year $534,716 was spent on the new sulfur property and $699,327 was invested in stock of the Cuban American Manganese Corp."

Du Pont Chemical Earnings

Du Pont's report for the last quarter of 1932 shows that earnings on chemical business, which in recent years has been greatly overshadowed by income from their investment in 9,981,220 shares of G. M. common stock, are now accountable for about half of du Pont's net profit. Of total earnings of 45 cents a share on the du Pont stock in the last quarter, 23 cents represented dividends on the G. M. investment. In the corresponding quarter of 1931, total earnings were 92 cents a share, of which 68 cents were contributed by the G. M. stock.

Break-Down

An analysis of the company's business contained in the final report shows that there are six industrial departments and four wholly owned subsidiaries, each a self-contained unit manufacturing and distributing chemical products. Following table shows order of importance of these units from the standpoint of volume of business and of capital invested for 1932:

Departments or Subsidiary Companies	*Vol. of Business*	*Cap'l Inv.*
Organic chemicals dept. (dyestuffs, tetra-ethyl lead, ethyl alcohol and other organic chemicals)	1	1
Fabrics and finishes dept. (pyroxylin finishes, paints and varnish, pyroxylin and rubber-coated fabrics)	2	5
Grasselli Chemical Co. (inorganic heavy chemicals, acids, zinc, etc.)	3	2
Du Pont Cellophane	4	7
Du Pont Rayon	5	3
Explosives dept. (commercial explosives and blasting accessories)	6	4
R. & H. Chemical dept. (electrochemicals and chem. specialties)	7	8
Du Pont Viscoloid (pyroxylin and acetate plastics and articles fabricated therefrom)	8	9
Ammonia dept. (synthetic ammonia, ammonia products, methanol and higher alcohols)	9	6
Smokeless powder dept. (sporting and military explosives)	10	10

In summarizing the outlook for business, Mr. du Pont said:

"The downward trend of industrial activity of the preceding two years was continued during the first half of 1932. Since then in some important branches of industry there has been a noticeable improvement, which has continued to the present time with only seasonal changes. Several of your company's activities have participated in this improvement.

Dividends and Dates

Name	*Div.*	*Stock Record*	*Payable*
Allied Chem. & Dye	$1.50	Jan. 11	Feb. 1
Amer. Home Prods.	.35	Jan. 14	Feb. 1
Archer-Daniels-Mid. pf.	$1.75	Jan. 21	Feb. 1
Atlas Powd., pf.	$1.50	Jan. 20	Feb. 1
Columbian Carbon.	.50	Feb. 14	Mar. 1
Dow Chem., com.	.50	Feb. 1	Feb. 15
Dow chem., pf.	$1.75	Feb. 1	Feb. 15
Freeport Texas	.50	Feb. 15	Mar. 1
Glidden Co pr, pf.	$1.75	Mar. 17	Apr. 1
Hercules Powd., pf.	$1.75	Feb. 3	Feb. 15
Int'l Nickel, pf.	$1.75	Jan. 3	Feb. 1
Int'l Printing Ink pf	$1.50	Jan. 14	Feb. 1
Lehn & Fink	.50	Feb. 15	Mar. 1
Nat'l Carbon, pf.	$2.00	Jan. 20	Feb. 1
Nat'l Lead, pf A	$1.75	Mar. 3	Mar. 15
Nat'l Lead, pf B	$1.50	Jan. 20	Feb. 1
N. J. Zinc	.50	Jan. 20	Feb. 10
Proctor & Gamble	.37½	Jan. 25	Feb. 15
Shawinigan W & P.	.13	Jan. 21	Feb. 15
Sherwin-Williams	.25	Jan. 31	Feb. 15
Sherwin-Williams, pf	$1.50	Feb. 15	Mar. 1
Solvay Amer. Invest. pf.	$1.37½	Jan. 16	Feb. 15
Vulcan Detinning pf.	$1.75	Apr. 7	Apr. 20

"Numerous readjustments that have been taking place in business since 1929 may ultimately be found to have helped clear the way for the reappearance of more normal conditions," declared Lammot du Pont.

"These readjustments," said Mr. du Pont, "inevitably follow an interruption of industrial activity occasioned by overzealous enthusiasm and unbalanced efforts for too rapid expansion. While the magnitude and severity of the current depression and the geographical area involved have been greater than in any previous experience there have appeared no ailments which may not be expected to yield to patience, enterprise and courage."

All departures from custom in dealing with the unemployment situation and other problems were distinctly frowned upon by Mr. du Pont.

"Many of these desperate efforts to better our conditions," he said, "shock our judgment and common sense. We are told that by violating the integrity of our medium of exchange, we may in some way escape the grief which invariably followed in the wake of similar efforts in this and other countries. We are told to abandon efficiency in operations and to declare a moratorium on technical research because they increase unemployment.

"The success of business will be secure when confidence fully returns. Confidence cannot return until the fears arising from the threat of unwise and disturbing legislative projects are allayed."

Mr. du Pont gave it as his opinion that the most important steps in the restoration of confidence are "drastic curtailment of public expenditures and a lowering of the tax burden."

International Nickel stockholders will vote at a special meeting after the annual meeting March 28 on a plan to cancel 167 preferred shares and 4,000 common shares, surrendered since Dec. 1929, and for issuance of similar amounts of new stock.

Dividend Action

Sherwin Williams declared quarterly dividend of 25 cents on common, payable Feb. 15 to stock of record Jan. 31 and regular quarterly dividend of $1.50 on preferred, payable March 1 to stock of record Feb. 15. In previous quarter a common dividend of 37½ cents was paid and six months ago 50 cents.

P. & G. declared quarterly dividend of 37½ cents on common, placing issue on a $1.50 annual basis, against $2 previously. Dividend is payable Feb. 15 to stock of record January 25.

Atlas Powder declared regular quarterly dividend of $1.50 on preferred, payable Feb. 1 to stock of record Jan. 20.

Columbian Carbon declared quarterly dividend of 50 cents per share, payable March 1 to holders of record Feb. 14. A like amount was paid on Aug. 1 and Nov. 1, 1932 against 75 cents per share on Feb. 1 and May 2, 1932. At a meeting last November directors decided, beginning this year to put ahead one month date of the dividend meeting and the stock of recrod and payable dates on the dividend.

Dow Chemical declared dividends of 50 cents a share on no-par common and of 1¾ per cent. a share on preferred. Both dividends are payable Feb. 15 to stockholders of record Feb. 1.

Liquidated

Stockholders of Seaboard Oil & Guano, Reedville, Va., decided to liquidate Jan. 23 assets because of insufficient working capital. Seaboard Oil & Guano, formerly one of the largest and wealthiest companies of its kind operating on the Atlantic seaboard, was organized about a quarter of a century ago.

Over the Counter Prices

	December 31		January 31	
J. T. Baker	8	12	8	12
Dixon	25	30	18	25
Merck, pfd	72	76	77	81
Solid C	¾	1¾	¾	1¾
Young, J. S. pfd.	80		80	
Young, J. S., com	45	58	45	58

Foreign Markets

London	**December 31**	**January 31**
British Celanese	7s 10½d	7s 9d
Celanese	51s 3d	41s 3d
Courtaulds	£1½	£1½
Distillers	55s 3d	53s 3d
Imperial Chemical	25s 6d	25s 9d
Un. Molasses	7s 4½d	6s 7d
Paris		
Kuhlmann	546	538
L'Air Liquide	874	822
Berlin		
I. G. Farm	96	107
Milan		
Italgas	13¾	12¾
Montecatini	100	115 ½
Snia Viscosa	200	161

Earnings at a Glance

Company	Annual Dividends	Net Income 1932	Net Income 1931	Common Share Earnings 1932	Common Share Earnings 1931
Air Reduction:					
Dec. 31, quarter....	$3.00	$626,628	$1,011,290	$.74	$1.20
Year, Dec. 31.....	3.00	2,293,760	3,815,409	2.72	4.54
Amer. Com. Alcohol:					
Dec. 31, quarter....	f....	$181,543	†$334,823	$.93	....
†Year, Dec. 31.....	f....	586,365	†597,651	3.01	....
Atlas Powder Co.:					
Dec. 31, quarter....	f....	$120,573	.....	p$1.33	....
Year, Dec. 31.....	f....	42,072	746,454	p.46	.59
Commercial Solvents:					
Year, Dec. 31.....	.60	1,282,343	2,118,318	.50	.83
Devoe & Reynolds:					
Year, Nov. 30.....	f....	21,765	334,590	hh1.62	c1.12
duPont de Nemours:					
Year, Dec. 31.....	2.00	26,234,778	53,190,060	h 1.82	j4.29
Hercules Powder:					
Year, Dec. 31.....	1.50	889,763	1,430,538	h.24	h1.04
Industrial Rayon:					
Dec. 31, quarter....	2.00	448,179	285,920	3.10	1.97
Year, Dec. 31.....	2.00	237,251	683,891	1.64	4.71
National Lead:					
Year, Dec. 31.....	5.00	3,301,612	4,022,421	3.15	5.48
Wood Chemical Products Co.:					
Year, Dec. 31.....	f....	†30,414	†50,618	....	....

fNo common dividend.
pOn preferred stock.
hhOn 7% first preferred stock.
hOn shares outstanding at close of period.
†Net loss.

Company Reports

Air Reduction Reports Net Profit of $2,293,760

Air Reduction, and wholly owned subsidiaries for year ended Dec. 31, 1932, shows consolidated net profit of $2,293,760 after federal taxes, depreciation, etc., equivalent to $2.72 a share on 841,288 no-par shares of capital stock. This compares with $3,815,409 or $4.54 a share in 1931.

For quarter ended Dec. 31, 1932, consolidated net profit was $626,628 after charges and federal taxes, equal to 74 cents a share on 841,288 shares, comparing with $425,920 or 50 cents a share in preceding quarter and $1,011,290 or $1.20 a share in December quarter of 1931.

Current assets as of Dec. 31, 1932, including $5,426,217 cash, amounted to $11,045,314 and current liabilities were $1,251,431 comparing with cash of $5,601,703, current assets of $19,088,372 and current liabilities were $1,628,645 at close of preceding year.

Consolidated income account for year 1932 compares as follows:

	1932	1931	1930	1929
Gross income	$11,730,888	$15,641,352	$19,515,133	$21,801,993
Oper exp.	8,253,045	10,114,563	12,330,024	13,105,608
Oper income	$3,477,843	$5,526,789	$7,185,109	$8,696,385
Other income	679,938	734,754	931,315	.....
Total income	$4,157,781	$6,261,543	$8,116,424	$8,696,385
Depr res, etc.	1,647,875	2,003,162	2,211,479	2,159,506
Federal tax	216,146	442,972	654,566	563,884
Net profit	$2,293,760	$3,815,409	$5,250,379	$5,972,995
Dividends	2,523,855	3,785,782	3,661,897	3,228,059
Deficit	$230,095	*$29,627	*$1,588,482	*$2,744,936

*Surplus.

Quarter ended December 31:

	1932	1931	1930	1929
Gross income	$3,034,481	$3,773,525	$4,739,788	$5,819,923
Oper exp.	1,961,141	2,211,813	2,836,928	2,444,305
Oper income	$1,073,340	$1,561,712	$1,902,860	$2,375,618
Depr, etc.	401,549	451,313	609,604	715,309
Fed'l taxes	45,163	99,109	191,080	‡19,730
Net Profit	$626 628	$1,011,290	$1,102,176	$1,680,039

‡Cred

Wood Chemical Products has reported net loss of $30,414 for the year ended Dec. 31, 1932, after depreciation and other charges. This compared with $50,618 net loss in 1931.

Consolidated Chemical Industries reports for year ended Dec. 31, net income $312,258 after taxes and charges. This is equal after class A dividends to 6 cents a share on 80,000 class B shares compared with $430,290 or $1.51 a share on the class B in 1931.

Du Pont Shows Earnings of $1.82 a Share

Du Pont report for 1932, shows earnings applicable to common stock were $19,769,395 or $1.82 a share on 10,867,678 average shares outstanding, which compares with $47,216,932, or $4.29 a share for 1931 on 11,008,512 average shares outstanding. Figures for both years include du Pont Co.'s equity in undivided profits or losses of controlled companies not consolidated.

Net income from operations for 1932 was $10,354,134, and in 1931 it was $21,109,352. Income from investments for 1932 was $16,948,295, which includes $4,448,022 income from marketable securities, investment in affiliated companies not wholly owned and miscellaneous investments, and $12,500,273 income from G. M. investment. In 1931 income from investments was $34,377,602, which includes $4,434,673 income from marketable securities, investment in affiliated companies not wholly owned and miscellaneous investments, and $29,942,929 income from G. M. investment. Net income for 1932, after making provision for Federal income taxes and interest on bonds of subsidiary companies, was $26,234,778, which is equal to four times the debenture stock dividends. Net income for 1931 was $53,190,060.

STATEMENT OF CONSOLIDATED INCOME AND SURPLUS INCOME ACCOUNT FOR YEAR ENDING DEC. 31, 1932

	1932	1931
Income from Operations before Provision for Depreciation & Obsolescence.	$23,363,886.59	$33,608,367.61
Less—Provision for Depreciation and Obsolescence of Plants and Equipment	13,009,752.90	12,499,015.48
Net Income from Operations	$10,354,133.69	$21,109,352.13
Income from Marketable Securities, Investment in Affiliated Companies not wholly owned and Miscellaneous Investments	4,448,022.47	4,434,672.63
Total	$14,802,156.16	$25,544,024.76
Less—Provision for Fed. Inc. Tax.	997,234.68	2,224,511.21
Net Income, exclusive of Income from Investment in General Motors Corp.	$13,804,921.48	$23,319,513.55
Income received from Investment in General Motors Corporation	12,500,273.21 (a)	29,942,929.62 (a)
Net Income before Interest on Bonds of Subsidiary Companies	$26,305,194.69	$53,262,443.17
Less—Interest on Bonds of Subsidiary Companies	70,416.11	72,383.33
Net Income	$26,234,778.58	$53,190,059.84
Less—Dividends on Debent. Stock.	6,529,298.55	6,189,873.82
Consolidated Earnings Applicable to Common Stock	$19,705,480.03	$47,000,186.02
Including E. I. du Pont de Nemours & Company's equity in undivided profits or losses of controlled companies not consolidated, amount earned on common stock is	$19,769,394.94	$47,216,932.38
Average number of shares of common stock outstanding during the year	10,867,678	11,008,512
Amount earned a share	$1.82	$4.29

National Lead Profits Decline

National Lead Co. for year ended Dec. 31, 1932, shows net profit of $3,301,612, including non-recurring profits and after provision for taxes and reserves, equivalent after preferred dividends, to $3.15 a share on 309,831 shares of common stock. This compares with $4,022,421 or $5.48 a share in 1931. These figures include income from investment of insurance reserve and employes' liability reserve funds. Consolidated income account for year 1932, compares as follows:

	1932	1931	1930
Net sales	$34,845,599	$50,856,343	$76,712,337
Cost of sales	25,444,470	40,234,130	61,977,312
Profit on sales	$9,401,129	$10,622,213	$14,735,025
Other income	2,945,149	3,087,505	3,164,659
Total income	$12,346,278	$13,709,718	$17,899,684
Exp and taxes	8,554,694	8,254,762	11,535,015
Depreciation and depl.	489,972	1,432,535	1,689,571
Net profit	$3,301,612	$4,022,421	$4,675,098
Class A pfd divs	1,705,732	1,705,732	1,705,732
*Class B pfd divs	619,662	619,662	619,662
Common dividends	1,549,155	1,626,612	2,478,648
Deficit	$572,937	†$70,415	$128,944
Previous surplus	21,533,056	21,462,641	21,591,585
P & L surplus	$20,960,119	$21,533,056	$21,462,641

*Includes $154,915 payable February 1. †Surplus.

Freeport Texas Net Declines Slightly

Freeport Texas and wholly owned subsidiaries for year ended Dec. 31, 1932, certified by independent auditors, shows net income of $2,005,098 after depreciation, federal taxes, and after providing $190,000 for prospecting and contingencies. This is equal to $2.75 a share on 729,844 no-par shares of capital stock, and compares with net income of $2,376,782 or $3.26 a share in 1931.

Current assets as of Dec. 31, 1932, amounted to $8,626,173 and current liabilities were $2,392,335, comparing with $9,618,546 and $3,618,149, respectively, at end of preceding year. At close of 1932, cash was $2,244,362, against $2,154,029 on Dec. 31, 1931.

Consolidated income account for year 1932 compares as follows:

	1932	*1931*	*1930*
Gross sales	$8,437,386	$10,192,150	$13,906,178
Costs and expenses	5,696,540	7,234,952	10,161,087
Oper profit	$2,740,846	$2,957,198	$3,745,091
Other inc.	19,764	41,998	162,202
Total inc.	$2,760,610	$2,999,196	$3,907,293
Fed taxes	248,000	258,561	332,384
Depree res.	320,716	307,466	361,853
Prov for cont	190,000	.....	.....
Other chgs.	*3,204	56,387	88,871
Net income	$2,005,098	$2,376,782	$3,124,185
Dividends	1,459,688	1,642,149	2,919,376
Surplus	$545,410	$734,633	$204,809

*Credit.

Atlas Powder's Net Profit $42,072

Atlas Powder for year ended Dec. 31, 1932, shows net income of $42,072 after charges, depreciation and taxes, equivalent to 46 cents a share (par $100) on 90,178 shares of 6% preferred stock, excluding treasury shares. This compares with net income in 1931 of $746,454, equal after 6% preferred dividends, to 59 cents a share on 261,438 no-par shares of common stock.

For quarter ended Dec. 31, last, net income was $120,573 after taxes and charges, equal to $1.33 a share on 90,178 shares of 6% preferred stock, comparing with $75,897 or 83 cents a share on 90,761 preferred shares in preceding quarter.

Current assets as of Dec. 31, 1932, including deferred charges, but excluding investment in Atlas Powder Co. capital stock, amounted to $9,276,720, while current liabilities were $457,400. This compares with current assets, on above basis, of $9,329,228 and current liabilities of $476,546 at close of 1931. On Dec. 31, last, cash, U. S. government securities and other marketable securities, at cost, aggregated $5,237,161. This compares with cash and marketable securities of $5,086,468 on Dec. 31, 1931. U. S. government and other marketable securities, at cost, were $218,632 in excess of market value on Dec. 31, 1932, against a similar excess of $227,898 at end of 1931. Consolidated statement for year 1932, compares as follows:

	1932	*1931*	*1930*	*1929*
Net sales	$8,590,556	$12,093,890	$16,468,361	$22,011,930
*Net income	42,072	746,454	1,246,432	2,542,692

*After depreciation, taxes, etc.

Commercial Solvents Shows Profit of 50c a Share

Commercial Solvents Corp. for year ended Dec. 31, 1932, certified by independent auditors, shows consolidated net profit of $1,282,343 after federal taxes, inventory adjustments, etc., equivalent to 50 cents a share on 2,530,255 no-par shares of capital stock. This compares with $2,118,318, or 83 cents a share on 2,530,126 shares in 1931.

Current assets as of Dec. 31, 1932, including $2,541,911 cash and U. S. Government securities, but excluding company's common stock held as an investment, were $6,328,685 and current liabilities were $320,537. This compares with current assets on Dec. 31, 1931, including $4,804,303 cash, U. S. Government and other marketable securities, but excluding company's common stock held as an investment, of $6,694,006, and current liabilities were $375,567.

Consolidated income account for year 1932 compares as follows:

	1932	*1931*	*1930*	*1929*
Oper profit	‡$939,555	‡$2,074,042	*$2,918,245	*$4,407,922
Other income	431,795	317,517	231,100	383,136
Tot. income	$1,371,350	$2,391,559	$3,149,345	$4,791,058
Charges	19,007	113,466	96,445	233,154
Fed taxes, inv adj. etc...	70,000	159,775	335,900	890,502
Net profit	$1,282,343	$2,118,318	$2,717,000	$3,667,402
Dividends	1,518,125	2,530,001	2,481,947	1,957,855
Deficit	$235,782	$411,683	†$235,053	†$1,709,547

*After depreciation. †Surplus. ‡At December 31, 1930, the then remaining net book value of the corporation's land, buildings and equipment was written down from $1,725,238 to the nominal value of $1 by a charge against earned surplus, and has since been maintained at that figure, consequently the 1932 and 1931 earnings bear no charge for depreciation.

American Commercial Alcohol (preliminary report) and subsidiaries for year ended Dec. 31, 1932, shows net income of $586,365, after charges, taxes, depreciation, etc., equal to $3.01 a share (par $20) on 194,747 shares of common stock. This compares with net loss of $597,651 in 1931. Net income for quarter ended Dec. 31, 1932, was $181,543, after taxes, charges and depreciation, equal to 93 cents a common share, comparing with net income of $160,417, or 82 cents a share, in the preceding quarter, and net loss of $334,823 in Dec. quarter of 1931.

Annual Reports Show that——

Tabulation shows number of times interest charges and preferred dividend requirements have been earned in 1932, together with important balance sheet items, as abstracted from annual reports:

	Interest times earned	*Pfd. div. times earned*	*Cash and mark securities*	*Inventories*	*Ratio cur. assets cur. liabil.*	*Working capital*
Air Reduction Co.:						
Year, December 31, 1932	No fd. dbt.	f$0.90	†$5,426,217	$1,625,227	8.8	$9,793,884
Year, December 31, 1931	No fd. dbt.	f1.01	†5,601,703	1,661,951	11.7	17,459,727
Atlas Powder Co.:						
Year, December 31, 1932	No fd. dbt.	0.08	b$5,237,161	$1,860,669	20.3	$8,819,319
Year, December 31, 1931	No fd. dbt.	1.26	b5,086,468	2,016,543	21.9	9,955,728
Commercial Solvents Corp.:						
Year, December 31, 1932	No fd. dbt.	No pfd.	b$2,541,911	$3,206,463	19.7	$6,008,148
Year, December 31, 1931	No fd. dbt.	No pfd.	b4,804,304	1,418,475	17.8	6,318,439
Devoe & Raynolds Co., Inc.:						
Year, November 30, 1932	No fd. dbt.	0.14	1,830,276	2,331,217	21.9	5,851,094
Year, November 30, 1931	No fd. dbt.	2.01	1,638,710	2,712,269	18.9	6,609,576
du Pont de Nemours, E. I., & Co.:						
Year, December 31, 1932	d....	4.02	c62,702,400	28,557,810	10.1	c96,694,896
Year, December 31, 1931	d....	8.62	c68,722,516	33,564,317	10.6	c110,455,973
Freeport Texas Co.:						
Year, December 31, 1932	No fd. dbt.	No pfd.	2,244,362	5,712,528	3.6	6,233,839
Year, December 31, 1931	No fd. dbt.	No pfd.	2,154,029	6,591,107	2.7	6,000,397
Hercules Powder Co.:						
Year, December 31, 1932	No fd. dbt.	1.19	6,998,726	4,249,622	25.4	14,049,053
Year, December 31, 1931	No fd. dbt.	2.97	6,836,773	5,112,060	24.2	14,560,404
Industrial Rayon Corp.:						
Year, December 31, 1932	c24.42	No pfd.	3,945,823	862,555	8.6	4,885,240
Year, December 31, 1931	c40.92	No pfd.	3,055,149	1,634,914	7.3	5,200,905

†Common dividends times earned; b securities covered at cost; c Interest on debt of subsidiary.

The Industry's Securities

1933 Jan. Last	1933 Jan. High	1933 Jan. Low	1932 High	1932 Low	1931 High	1931 Low	Sales In January	Sales During 1933	Stocks	Par $	Shares Listed	An. Rate		Earnings $-per share-$ 1931	Earnings $-per share-$ 1930
NEW YORK STOCK EXCHANGE															
59¼	64½	58⅝	63½	30⅞	109⅜	47⅜	48,700	48,700	Air Reduction	No	841,288	$3.00		4.54	6.32
84⅜	89⅞	80½	88½	42½	182½	64	237,600	237,600	Allied Chem. & Dye	No	2,401,000	6.00		6.74	9.77
121½	121½	118⅜	120†	96½	133½	100	4,200	4,200	7% cum. pfd.	100	393,000	7.00			
9¼	10½	9¼	15½	3½	29⅜	5½	4,200	4,200	Amer. Agric. Chem.	100	333,000		Yr. Je. '30		Nil
22⅜	19½	19½	27	11	14½	5	14,400	14,400	Amer. Com. Alc. (new)	20	375,000				d1.27
11	12	11	15½	7	18	10½	400	400	Archer Dan. Midland	No	550,000	1.00	Yr. Aug. 30		1.68
10½	12	9⅜	25½	7*	54	18	2,200	2,200	Atlas Powder Co.	No	261,438			.59	2.67
64	66	61	79½	45½	99¼	77¼	510	510	6% cum. pfd.	100	96,000	6.00			
32¼	35½	27¼	41⅞	13½	111⅝	32	70,800	70,800	Columbian Carbon	No	538,420	2.00		3.02	5.04
11½	12½	10	13¾	3½	21½	6⅜	141,300	141,300	Comm. Solvents	No	2,530,000	.60		.83	1.07
54¼	56½	52½	55⅜	24¼	86⅝	36½	75,700	75,700	Corn Products	25	2,530,000	3.00		3.54	4.82
141	145½	136½	140	99½	152½	116	640	640	7% cum. pfd.	100	250,000	7.00			
4½	4⅞	3½	9¼	1	23	3½	10,500	10,500	Davison Chem. Co.	No	504,000		Yr. Je. '30		4.00
38⅜	41½	36½	59¾	22	107	50⅜	203,600	203,600	DuPont de Nemours	20	11,008,512	2.00		4.29	4.67
102¼	106	102¼	105½	80¾	185½	91½	5,500	5,500	6% cum. deb.	100	1,098,831	6.00			
57½	61⅜	54	87½	35½	185½	77	49,700	49,700	Eastman Kodak	No	2,261,000	3.00		5.78	8.84
113	123	120½	125	99	135	103	30	30	6% cum. pfd.	100	62,000	6.00			
22½	26⅜	22½	28⅝	10	43¼	13½	37,300	37,300	Freeport Texas Co.	No	730,000	2.00		3.26	w4.77
17⅜	17½	16	29½	13⅞	43¼	13¼	2,800	2,800	Hercules Powder Co.	No	606,244	1.50		1.04	2.61
92½	93	87½	95	70½	119½	95	580	580	7% cum. pfd.	100	114,241	7.00			
...	1¼	1¼	3½	...	5½	1	700	700	Intern. Agric.	No	450,000		Yr. Je. '30		1.68
6	6	5	15	3½	51½	4½	400	400	7% cum. prior pfd.	100	100,000	7.00	Yr. Je. '30		14.58
7½	8½	7½	12½	3½	20⅛	7	61,900	61,900	Intern. Nickel	No	14,584,000			.22	.67
9	9	9	11	8	16½	9	300	300	Kellogg (Spencer)	No	598,000	60			b1.14
13½	14⅞	13½	22	9	55½	13½	4,000	4,000	Liquid Carbonic Corp.	No	342,000			2.96	5.22
16½	17½	15	20⅞	9	31½	12	6,000	6,000	Mathieson Alkali	No	650,426	1.50		1.88	2.96
101	101	100½	105	89¾	125⅞	106½	140	140	7% cum. pfd.	100	24,610	7.00			
30	31	27½	30½	13⅜	29	16½	7,000	7,000	Monsanto Chem.	No	416,000	1.25		2.98	1.73
17⅝	19	17	27¼	13	36⅜	16	11,200	11,200	National Dist. Prod. cts. (new)	No	252,000			—	1.23
60	60	56⅞	92	45	132	78½	200	200	National Lead	100	310,000	5.00			7.58
107½	109	105½	125	87	143	111	1,585	1,585	7% cum. "A" pfd.	100	244,600	7.00			
78⅛	80¼	78½	105	61	120	102	90	90	6% cum. "B" pfd.	100	103,000	6.00			
1⅝	2⅜	1⅛	4⅜	1	9½	2	1,000	1,000	Tenn. Corporation	No	857,000	1.00			1.21
22½	25	22	26½	12	55¼	19½	60,800	60,800	Texas Gulf Sulphur	No	2,540,000	2.00		3.52	5.50
26⅛	28⅜	25½	36⅜	15½	72	27½	120,300	120,300	Union Carbide & Carb.	No	9,001,000	1.20		2.00	3.12
13	15	12½	18	6⅝	28⅜	6½	29,000	29,000	United Carbon Co.	No	398,000			—	1.43
20½	27½	19½	36¼	13¼	77⅜	20⅜	31,500	31,500	U. S. Ind. Alc. Co.	No	373,846			—	x2.96
12¼	14¼	11⅜	23½	5¼	76⅜	11	19,200	19,200	Vanadium Corp. of Amer.	No	378,367				2.95
1	1	⅞	2⅜	⅝	3½	½	2,200	2,200	Virginia Caro. Chem.	No	487,000		Yr. Je. '30		Nil
4¼	4⅞	4⅛	11¼	3⅜	17	2¾	600	600	6% cum. part. pfd.	100	213,000		Yr. Je. '30		2.63
42¼	50½	42¼	69¼	20	72	35	300	300	7% cum. prior pfd.	100	145,000		Yr. Je. '30		11.96
7½	8	7½	12⅝	1	40	7⅝	1,000	1,000	Westvaco Chlorine Prod.	No		1.00		1.79	2.51
NEW YORK CURB															
4½	5¼	4	8½	1⅝	12¾	2⅜	9,600	9,600	Amer. Cyanamid "B"	No	2,404,000			.21	
316	316	316	...	...	15	¼	200	200	Anglo-Chilean Nitrate	No	1,757,000		Yr. Je. '30		Nil
...	...	...	2⅝	...	2⅜	...			Brit. Celanese Am. Rcts.	2.13	2,806,000				
35	40	35	55	8	81¼	16½	200	200	Celanese 7% cum. part. 1st pfd.	100	148,000	7.00			
60	60	60	64½	17	65	25	100	100	" 7% cum. prior pfd.	100	115,000	7.00			
...	...	...	5⅜	1⅛	...	...			Celluloid Corp.	No	195,000				
...	...	...	6⅞	4½	9	5¾			Courtaulds, Ltd.	1£					
34	34	33	39	21½	51	30¼	200	200	Dow Chemical	No	630,000	2.00			3.44
1	1	1	1½	...	¼	...	500	500	Duval Texas Sulphur	No	500,000				
10	10	9¼	...	...	13	6½	300	300	Heyden Chemical Corp.	10	150,000	1.00			
...	...	...	2⅞	2¼	3½	2⅜			Imperial Chem. Ind.	1£				1.21	
11	11¼	9⅝	20⅞	6¼	60	20	1,800	1,800	Shawinigan W. & P.	No	2,178,000	1.00			
½	¼	½	3	½	12	⅜	1,400	1,400	Silica Gel Corp.	No	600,000				
CLEVELAND STOCK EXCHANGE															
...	...	...	25	21¼	...	...			Cleve-Cliffs Iron $5 pfd.	No	498,000	5.00		—	11.42
...	33½	30	40	21½	51½	30	1,174	1,174	Dow Chemical Co.	No	630,000	2.00			3.44
...	...	...	...	...					Dow Chemical Co., pfd.	100	3,000,000	7.00			
120	120	120	...	...			48	48	National Carbon, pfd.	100	5,600,000	7.00			
PHILADELPHIA STOCK EXCHANGE															
29¼	29¼	26	40	19⅞	75	37¼	125	125	Pennsylvania Salt	50	150,000	3.00	Yr. Je. '30		7.97

1933 Jan. Last	1933 Jan. High	1933 Jan. Low	1932 High	1932 Low	1931 High	1931 Low	Sales In January	Sales During 1933	Bonds	Date Due	Int. %	Int. Period	Out-standing $
NEW YORK STOCK EXCHANGE													
80	80	77	80	62	99	69½	10	10	Amer. Cyan. deb. 5s	1942	5	A. O.	4,554,000
82½	83½	76¼	80	54½	102	52	301	301	Amer. I. G. Chem. conv. 5½s	1949	5½	M. N.	29,933,000
3⅛	5½	3¼	18	1	63½	7½	46	46	Anglo-Chilean s. f. deb. 7s	1945	7	M. N.	14,600,000
...	45	43	60	34½	104	59	22	22	By-Products Coke Corp. 1st 5½s "A"	1943	5½	M. N.	6,629,000
103½	104½	103	104⅞	100½	105½	100	37	37	Corn Prod. Refin. 1st s. f. 5s	1934	5	M. N.	1,822,000
40½	54½	39⅞	54⅞	32			23	23	Int. Agric. Corp. 1st coll. tr. stamped to 1942	1942	5½		
3⅞	5	3⅞	15½	¼	75½	6	245	245	Lautaro Nitrate conv. 6s	1954	6	J. J.	32,000,000
98¼	98½	95½	97¾	67			61	61	Montecatini Min. & Agric. deb 7s with warrants	1937	7	J. J.	8,188,000
62	62	58	59	17			69	69	Ruhr chemical s. f. 6s	1948	6	A. O.	3,578,000
91½	92	88½	90	66	103	80	60	60	Solvay Am. Invest. 5% notes	1942	5	M. S.	15,000,000
55½	57	52	66	39	99	45	18	18	Tenn. Corporation deb. 6s. "B"	1944	6	M. S.	3,308,000
42⅛	48¾	42⅛	75	30			85	85	Vanadium Corp. conv. 5s	1941	5	A. O.	5,000,000
NEW YORK CURB													
61	65	56½	76	55	98¾	56	399,000	399,000	Shawinigan W. & P. 4½s. "A"	1967	4½	A. O.	35,000,000
61½	64	57½	76	55	98¼	58	150,000	150,000	4½s., series "B"	1968	4½	M. N.	16,108,000
102⅞	103½	102⅞	103⅛	99	104½	95	17,000	17,000	Westvaco Chlorine Prod. 5½s	1937	5½	M. S.	1,992,000

h 11 mos. ending Aug. 30; w 13 mos.; x Before inventory adjustment; *New Low; †New High

Cellulose Acetate
Uniformity and Stability

Acetic Anhydride
90/95%

Anhydrous Sodium Acetate

Cresylic Acid
Pale 97/99%

Casein
for all purposes

PLASTICIZERS
for
Cellulose Acetate and Nitrocellulose
in
Lacquers, Dopes and Plastics

Dibutyl Phthalate
Diethyl Phthalate
Dimethyl Phthalate
Dibutyl Tartrate
Triphenyl Phosphate

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Established 1846

80 MAIDEN LANE NEW YORK

Bicarbonate of Soda
Sal Soda
Monohydrate of Soda
Standard Quality

Chemical Exports and Imports

U. S. Chemical Export Figures for November

ARTICLES	NOVEMBER			
	1931		1932	
	Quantity	*Dollars*	*Quantity*	*Dollars*
COAL-TAR PRODUCTS		506,261		910,511
Benzol	3,263	919	183,732	39,453
Crude coal tar	14,418	38,411	24,752	40,180
Coal-tar pitch	10,682	93,386	38,497	470,598
Creosote oil	13,461	2,251	4,147	1,633
Coal-tar colors, dyes, stains, and color lakes	1,269,391	295,142	1,024,405	302,037
Other coal-tar products, exclusive of medicinals	830,587	76,152	438,533	56,610
INDUSTRIAL CHEMICAL SPECIALTIES		849,831		913,498
Nicotine sulphate (40% basis)	3,403	3,707	4,672	3,541
Lead arsenate	51,851	4,945	35,396	3,470
Calcium arsenate	406,900	14,986	335,000	11,520
Other agricultural insecticides, fungicides, and similar preparations and materials	261,237	36,803	464,287	36,242
Household insecticides and exterminators	319,332	98,136		
Liquid			186,764	64,294
Powdered and paste			12,194	4,359
Household disinfectants, deodorants, germicides, and similar preparations	118,056	14,136	110,599	19,591
Baking powder	284,281	82,743	260,203	70,624
Petroleum jelly	1,190,830	54,644	1,082,631	59,625
Tobacco extracts	138,163	25,455	78,773	11,560
Dextrine or British gum	1,033,331	43,106	919,948	34,120
Rubber compounding agents (accelerators, retarders, etc.)	128,240	79,196	131,222	72,055
Cementing preparations, for repairing, sealing, and adhesive use	165,126	22,248	301,119	46,874
Textile specialty compounds	341,318	23,298	558,519	27,850
Water softeners, purifiers, boiler and feed-water compounds	200,086	22,669	47,937	4,857
Metal-working compounds	42,754	9,115	59,719	6,055
Dry-cleaning preparations and stain removers	7,898	1,817	14,418	3,680
Other industrial specialty cleaning and washing compounds (exclusive of soap)	183,581	20,688	72,400	7,391
Polishes—				
Metal and stove polishes	47,265	6,453	100,089	11,464
Shoe polishes and shoe cleaners	86,299	30,084	68,788	16,586
Leather dressings and stains	153,922	28,929	359,990	36,953
Floor wax, wood and furniture polishes	70,152	12,693	56,047	9,847
Automobile polishes	112,241	33,027	38,555	7,937
Other polishing and buffing compounds	14,386	2,962	14,535	2,105
Other chemical specialty compounds, n. e. s		177,991		340,898
INDUSTRIAL CHEMICALS		1,425,849		1,103,178
Acids and anhydrides—				
Organic (exclusive of coal-tar acids)	23,349	6,403	56,538	7,299
Inorganic—				
Nitric	30,958	3,253	35,267	2,776
Sulphuric	319,733	5,697	395,958	5,114
Hydrocholoric (muriatic)	205,687	2,936	137,578	3,205
Boric (boracic)	297,441	13,440	182,034	7,767
Other inorganic acids and anhydrides	205,425	12,448	463,815	16,908
Alcohols—				
Methanol	37,473	16,491	83,731	36,791
Glycerol (glycerin)	22,968	3,023	24,167	3,206
Butanol (butyl alcohol)	25,849	3,289	127,016	13,130
Other alcohols	367,315	27,529	186,500	14,874
Acetone	284,507	21,656	265,867	20,841
Carbon tetrachloride	18,380	1,033	86,334	4,139
Carbon bisulphide	278,927	14,850	282,964	12,259
Formaldehyde (formalin)	111,472	6,125	63,045	3,483
Ethylene compounds	101,272	16,872	22,072	2,856
Citrate of lime	514,409	47,120	235,868	16,511
Other synthetic organic products	175,639	25,711	280,089	44,979
Nitro or aceto cellulose solutions, collodion, etc	195,266	37,911	225,293	41,323
Ammonium compounds (except sulphate, phosphate, and anhydrous ammonia)	112,331	8,592	225,499	3,434
Aluminum sulphate	5,722,696	60,327	3,117,414	34,421
Other aluminum compounds	94,738	9,198	2,694	187
Calcium compounds—				
Carbide	195,283	7,930	112,986	3,058
Chlorinated lime (bleaching powder)	396,245	5,946	63,807	3,788
Chloride	762,543	9,339	843,420	8,867
Other, except arsenate, cyanide, and citrate	76,189	4,734	39,265	2,639
Copper sulphate (blue vitriol)	345,067	11,678	138,652	3,526
Hydrogen, peroxide (or dioxide)	97,754	12,745	26,805	3,847
Potassium compounds (not fertilizers)	166,266	16,764	112,388	13,592
Sodium compounds	44,744,451	806,555	36,070,778	578,495
Bichromate and chromate	398,710	25,464	449,009	23,612
Cyanide	34,214	4,202	90,386	12,388
Borate (borax)	21,950,682	402,410	13,132,622	184,100
Silicate (water glass)	6,208,167	52,415	4,351,670	27,998
Soda ash	2,556,629	39,451	1,928,153	30,272
Sal soda	732,393	10,853	439,687	6,473
Bicarbonate (acid soda or baking soda)	2,034,282	31,833	1,207,173	20,039
Sulphate	87,612	1,337	400,414	2,332
Bisulphate (niter cake)	1,801,820	8,514	183,320	860
Hydroxide (caustic soda) in drums	8,014,575	192,393	13,034,906	235,047
Sulphide	125,854	2,852	17,871	485
Fluorides	5,675	462	1,428	153
Sodium phosphate (mono, di, or tri)	501,413	15,733	396,811	12,204
Other sodium compounds	292,425	18,636	437,328	22,532
Tin compounds	53,171	9,013	3,994	1,124
Zinc compounds	14,338	1,458	57,785	3,944
Gases, compressed, liquefied, and solidified—				
Ammonia, anhydrous	64,205	8,730	41,225	5,320
Chlorine	392,516	10,852	637,383	13,676
Other gases, n. e. s	100,568	19,861	2,693,136	46,124
Other industrial chemicals		156,340		119,676
PIGMENTS, PAINTS, AND VARNISHES		1,163,682		738,625
Mineral-earth pigments—				
Ocher, umber, sienna, and other forms of iron oxide for paints	666,439	20,377	557,642	11,932
Other mineral-earth pigments (whiting, barytes, etc.)	896,526	10,221	2,305,467	25,700
Chemical pigments—				
Zinc oxide	464,911	31,673	85,686	7,369
Lithopone	357,051	15,071	199,625	8,793
Bone black and lampblack	254,804	9,036	133,773	7,848
Carbon black or gas black	11,174,096	562,787	7,493,629	298,351
Red lead, litharge, and orange mineral	383,453	21,080		
Red lead			78,824	4,085
Litharge			265,636	11,177
White lead	412,133	21,473		
Dry			96,646	3,882
In oil			11,322	797
Other chemical pigments	338,868	48,130	267,959	45,388
Bituminous paints, liquid and plastic		44,811		39,034
Paste paint	313,035	50,482	199,906	19,411
Kalsomine or cold-water paints, dry	459,358	23,379	213,646	11,317
Nitrocellulose (pyroxylin) lacquers—				
Pigmented	19,167	55,247	13,544	33,602
Clear	5,277	10,251	6,704	16,033
Thinners for nitrocellulose lacquers	16,093	21,281	17,858	15,574
Ready-mixed paints, stains, and enamels	84,121	182,559	81,833	149,950
Varnishes (oil or spirit, and liquid dryers)	24,603	34,107	18,264	27,297
Paint and varnish removers	1,615	1,717	1,033	1,085
FERTILIZERS AND FERTILIZER MATERIALS	81,536	543,014	67,626	650,279
Nitrogenous fertilizer materials—				
Ammonium sulphate	253	9,788	135	3,874
Other nitrogenous chemical materials	2,205	79,678	12,063	276,846
Nitrogenous organic waste materials	826	14,188	1,635	23,068
Phosphatic fertilizer materials—				
Phosphate rock—				
High-grade hard rock	14,370	82,754	391	2,150
Land pebble	59,552	256,490	49,908	233,137
Superphosphate	2,636	27,690	186	3,326
Other phosphate materials	60	3,475	35	4,424
Potassic fertilizer materials—				
Potassium chloride or muriate			609	22,110
Other potash fertilizers	4	244	45	2,123
Concentrated chemical fertilizers—				
Nitrogenous phosphatic types	1,563	65,847	1,754	56,713
Nitrogenous potassic types				
Nitrogenous phosphatic potassic types			800	19,837
Prepared fertilizer mixtures	67	2,860	65	2,671

U. S. Chemical Export Figures for November (*Continued*)

ARTICLES	NOVEMBER 1931		NOVEMBER 1932	
EXPLOSIVES, FUSES, ETC.		129,327		94,265
Explosives—				
Smokeless powder lbs.	26,184	24,048	13,413	6,984
Other gun powder lbs.	3,506	1,116	2,213	739
Blasting powder lbs.	54,250	3,767	3,175	292
Dynamite lbs.	498,080	62,180	405,865	55,036
Other explosives lbs.	4,042	3,778	1,825	1,175
Fuses and blasting caps—				
Safety fuses lin. ft.	4,095,510	19,780	3,971,105	19,079
Blasting caps No.	1,257,250	14,658	345,400	10,960
SOAP AND TOILET PREPARATIONS		745,627		464,655
Soap—				
Medicated lbs.	22,971	15,051	20,705	14,355
Toilet or fancy lbs.	317,508	65,275	468,718	63,692
Laundry lbs.	1,853,887	111,461	919,143	50,245
Powdered or flaked lbs.	130,783	8,838	37,886	3,172
Shaving creams lbs.	34,655	16,591	25,473	8,165
Shaving cakes, powders, and sticks lbs.	20,707	5,396	45,600	11,070
Other soap lbs.	545,299	23,797	38,920	4,811
Scouring soaps and scouring powders lbs.	576,790	43,143		
Scouring soaps, bricks, pastes, and powders lbs.			323,078	28,045
Household washing powders lbs.			51,512	2,902

U. S. Chemical Import Figures for November

ARTICLES	NOVEMBER 1931 Quantity	1931 Dollars	NOVEMBER 1932 Quantity	1932 Dollars
GROUP 8.				
COAL-TAR PRODUCTS		851,826		775,016
Dead or creosote oil, free galls.	2,942,839	266,897	961,537	77,328
All other crudes, free		85,469		34,091
Acids, dut lbs.	350	70	91,709	6,283
All other intermediate, dut lbs.	44,671	22,621	135,150	107,622
Colors, dyes, stains, color acids, and color bases, n. e. s., but lbs.	400,487	435,209	477,688	527,594
Coal-tar medicinals, dut lbs.	1,633	15,327	4,014	11,484
Other finished coal-tar products, dut lbs.	6,836	26,233	6,098	10,614
MEDICINAL AND PHARMACEUTICAL PREPARATIONS		260,388		132,284
Quinine sulphate, free ozs.	64,000	19,749	25,056	9,569
Other quinine and other alkaloids and salts from cinchona bark, free ozs.	14,820	4,369	80	38
Other alkaloids, salts, and derivatives, dut		9,188		5,374
Antitoxins, serums, vaccines, etc., and blistering beetles, free		119		
Menthol, dut lbs.	38,765	99,819	11,700	19,541
Santonin and salts, free lbs.	31	2,850	88	6,360
Other medicinals, dut		1,181		90
All other preparations, n. e. s., dut		123,113		91,312
INDUSTRIAL CHEMICALS		1,086,479		1,109,807
Acetylene, butylene, ethylene, and propylene derivatives, dut lbs.	16,781	2,421	59,337	4,214
Acids and anhydrides—				
Acetic or pyroligneous, dut lbs.	139,580	9,771	1,780,956	112,574
Arsenious (white arsenic), free lbs.	797,703	19,399	1,384,052	32,048
Formic, dut lbs.			44,722	2,427
Oxalic, dut lbs.	33,585	1,845	110	19
Sulphuric (oil of vitriol), free lbs.	203,602	1,320	311,260	2,064
Tartaric, dut lbs.	124,544	24,584	144,484	21,620
All other, free lbs.			641	252
All other, dut lbs.	77,932	12,944	73,778	14,483
Alcohols, including fusel oil, dut		562		385
Ammonium compounds, n. e. s.—				
Chloride (muriate), dut lbs.	398,533	11,078	472,180	11,786
Nitrate, dut lbs.	459,608	12,592	335,776	5,942
All other, dut lbs.	13,000	747	23,940	1,175
Barium compounds, dut lbs.	203,210	5,286	98,978	2,349
Calcium compounds, dut lbs.	38,000	1,425	55,115	704
Cellulose products, n. e. s.—				
Acetate, dut lbs.	326	366	1,198	1,323
All other—				
Sheets, more than 3/1,000 inch thick, and other forms, dut lbs.	3,962	3,001	23,977	21,299
Sheets and strips, more than one inch wide, not over 3/1,000 inch thick, dut lbs.			2,088	1,494
Cobalt oxide, dut lbs.	48,955	51,961	36,820	32,968
Copper sulphate, free lbs.	136,640	13,921		
Copper sul-gross weight lbs.				
phate...copper content, dut lbs.				
Glycerin, crude, dut lbs.	518,235	22,754	620,284	20,330
Glycerin, refined, dut lbs.	390,547	22,549	344,151	19,504
Iodine, crude, free lbs.	31,619	107,203		
Lime, chlorinated, or bleaching powder, dut lbs.	235,950	5,767	333,964	12,405
Magnesium compounds, dut lbs.	984,225	10,779	1,047,495	15,704
Potassium compounds, n. e. s.—				
Argols, tartar, and wine lees, free lbs.	1,319,425	83,098	2,137,580	105,124
Carbonate, dut lbs.	980,341	41,797	1,054,969	42,516
Chlorate and perchlorate, dut lbs.	801,152	28,881	896,740	32,786
Cream of tartar, dut lbs.			5,500	542
Cyanide, free lbs.	18,682	6,553	5,290	1,863
Hydroxide (caustic potash), dut lbs.	575,670	31,654	648,260	33,627
Nitrate, crude (saltpeter), free tons	204	12,636	2,891	77,503
Other potassium compounds, n. e. s., dut lbs.	560,452	28,994	178,528	11,475
Sodium compounds, n. e. s.—				
Chlorate, dut lbs.			11,000	522
Sulphate (salt cake), free lbs.	8,301,249	44,770	17,732,456	90,817
Cyanide, free lbs.	1,234,936	135,837	1,196,000	134,870
Ferrocyanide (yellow prussiate), dut lbs.	44,996	3,839	41,614	3,431
Nitrate, dut lbs.	220	45		
Phosphate (except pyrophosphate), dut lbs.	49,604	667	800	22
Other sodium com- free lbs.			62,889	742
pounds, n. e. s. dut		37,119		50,000
Radium salts, free grains	3	10,818	8	28,352
Other industrial chemicals free		121,146		34,157
Other industrial chemicals dut		156,350		124,389
PIGMENTS, PAINTS, AND VARNISHES		151,242		144,359
Mineral earth pigments—				
Iron oxide and iron hydroxide, dut lbs.	771,362	18,910	793,328	13,246
Ochers and siennas, dut lbs.	1,018,162	14,025	639,492	7,722
Other mineral earth pigments, dut		35,583		38,340
PIGMENTS, PAINTS, AND VARNISHES—Continued.				
Chemical pigments—	Quantity	Dollars	Quantity	Dollars
Lithopone and zinc pigments, n. e. s., dut lbs.	313,069	11,754	1,097,069	30,700
Zinc oxide and leaded zinc oxide, dut lbs.	258,012	16,004	555,819	22,024
Other chemical pigments, dut lbs.	699,753	30,153	197,809	10,682
Paints, stains, and enamels, dut		21,986		20,177
Varnishes, dut galls.	1,082	2,827	555	1,468
FERTILIZERS AND MATERIALS tons.	76,593	2,299,282	77,689	1,542,397
Nitrogenous—				
Ammonium sulphate, free tons.	14,947	371,017	25,614	378,954
Ammonium-sulphate-nitrate, free tons.	44	1,990		
Calcium cyanamide, or lime nitrogen, free tons.	1,956	40,395	6,069	168,499
Calcium nitrate, free tons.	1,786	45,483	1,002	15,203
Guano, free tons.			6,572	140,313
Dried blood, free tons.	327	10,283	244	6,029
Sodium nitrate, free tons.	30,871	1,154,828	4,887	115,491
Urea and calurca, free tons.	1,158	89,172	106	9,518
Other nitrogenous, free tons.	492	16,858	1,503	23,213
Phosphates—				
Bone ash, dust, and meal, and animal carbon fertilizers, free tons.	5,170	95,242	3,064	49,974
Other phosphates, free tons.	432	8,845	1,794	18,131
Potash fertilizers—				
Chloride, crude, free tons.	8,128	280,525	7,877	273,386
Kainite, free tons.	403	3,576	3,808	35,189
Manure salts, free tons.	3,196	44,635	9,263	133,902
Sulphate, crude, free tons.	1,105	50,280	3,520	153,095
Other potash-bearing substances, free tons.	40	312	40	900
Fertilizers, compounded or combined, containing nitrogen, phosphoric acid, and potash, free tons.	458	25,324	3	143
All other, free tons.	6,080	60,517	2,323	20,457
EXPLOSIVES		19,925		11,845
Powder and other ex- free lbs.				
plosives, n. e. s. dut				188
Firecrackers, dut lbs.	163,058	19,102	110,301	11,483
Fireworks and ammunition, dut		823		174
SOAP AND TOILET PREPARATIONS		216,032		202,597
Soap—				
Castile, dut lbs.	152,355	12,499	161,705	12,560
Toilet, dut lbs.	131,846	34,500	228,701	53,713
All other, dut lbs.	137,061	14,473	131,690	10,346
Perfume materials free lbs.	2,562	21,851	318	15,013
Perfume materials dut		37,805		40,285
Perfumery, bay rum, and toilet water, dut		58,987		40,744
Bath salts, dut lbs.	1,640	426	4,180	358
Cosmetics, powders, creams, etc., dut		35,491		29,578
ARTICLES IN GROUP 8, ORDINARILY DUTIABLE, IMPORTED FREE		4,927		2,244

Compiled from Monthly Summary of Foreign Trade of the United States, of the Dept. of Commerce

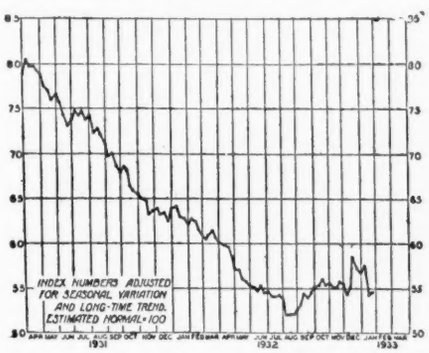
The Trend of Prices

State of Business

Despite abnormally high temperatures for January in parts of the U. S., trade was, generally speaking, fair. Nevertheless, it is undeniable that business retail and wholesale is quiet and still considerably below normal. Retail trade has been aided only by a continuation of "bargain sales."

The heavy industries in the past month showed only slight progress. Steel activity, after continuing most of the month around 13-16 per cent., climbed in the last few days to 19 per cent. However, this improvement was offset considerably, by the fact, that prices were weaker. Automobile production held up rather well, but was effected in the last few days by the sudden and unexpected halt in Ford production caused by the strike in the Briggs' plant. Electric power production declined to a new low record. Further, textile activity continued to hold at good levels, and freight car loadings in the last week of the month dropped again down to the December low point. Building activity continued to drag along at

N. Y. Times Index of Business Activity



abnormally low levels. Generally speaking, the commodity markets followed the lead of the stock market and trading was light and fluctuations small and of relative unimportance. Fishers' index was down, however, to a new low, 55.5, a decline of 2.2 points in the 30 day period, and *N. Y. Journal of Commerce's* index also reached a new low.

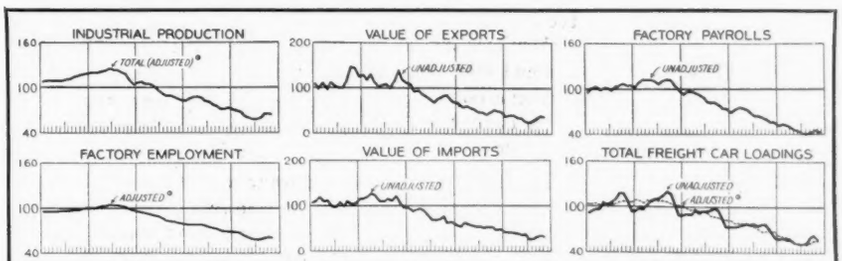
Slow Recovery

Business, while showing some seasonal improvement, did not forge ahead on the pathway of recovery at a very rapid pace. The uncertainties which held the stock market movements within very narrow limits worked in a similar manner on business activity. Buying, generally speaking, is still being held to small purchases for immediate delivery and forward commitments are avoided if possible.

Indices of Business

	Latest Available Month	Previous Month	Year Ago
Automobile Production, Nov.	59,556	48,702	68,867
–†Brokers Loans, Jan. 25	$378	$367	$513
*Building Contracts, Dec.	$81,219	$105,302	$136,851
–*Car Loadings, Jan. 21	496	506	562
†Commercial Paper, Dec. 31	$81	$109	$118
–†Elec. output, kwh, Jan. 21	1,484	1,495	1,598
Payrolls, Dec.	49.9	41.8	55.8
Failures, Dun, Dec.	$64,188	$53,621	$73,212
*Merchandise Imports, Dec.	$97,000	$104,000	$153,773
*Merchandise Exports, Dec.	$136,000	$139,000	$184,070
Furnaces in Blast, Jan. 5	14.7	17.9	17.8
*Steel Orders, Dec. 31	1,968	1,968	2,735

*000 omitted. †000,000 omitted. –Weeks, not months.



Business indicators, Department of Commerce. The weekly average 1923-25 inclusive = 100.

The *N. Y. Times* of index of business activity registered a slight gain in the first week of the month, but then slumped badly in the second week. The third week again saw some improvement, but the index was still considerably below the high reached in the middle of December.

	Week Ended			
	Jan. 21 1933	*Jan. 14 1933*	*Jan. 7 1933*	*Jan. 23 1932*
Freight car loadings	54.4	55.1	56.8	61.7
Steel mill activity	*18.5	17.2	17.2	32.0
Electric power prodn.	64.0	64.3	68.8	73.9
Automobile production.	42.2	*36.3	43.2	42.1
Carded cotton cloth production	94.8	93.0	96.8	94.2
Combined index	54.6	54.3	57.5	62.8

*Revised.

Tonnages Slightly Higher

A seasonal upturn in the volume of shipments in the chemical industry raised the level of activity in plants from the low reached in December. However, the increase was certainly not exceptional. Buying was done cautiously and in small quantities. Pick-up was most noticeable in the textile industry which continued to feature the demand for chemicals. Alkali producers were encouraged by the tonnage requirements for rayon. The paper industry showed signs of improvement, but the ceramic field was still slow. Demand from plating centers was good in January, but some let-up is expected in February, unless automobile dealers' stocks are depleted faster than anticipated. Seasonal items moved out in fairly good volume and producers of insecticidal materials were busy closing 1933 contracts.

An increase in inquiries for fertilizer materials was reported. After a poor start in the first 10 days of the month, trading in naval stores turned more active. Consumption of coal tar chemicals was better, due to the further expansion in the textile centers. Only a routine demand for paint materials occurred in January, but seasonal increase is looked for in February. Quiet conditions ruled in the fats and oils markets with buyers still unwilling to enter into future commitments on anything like a broad scale. Certain of the seasonal fine chemicals were in better demand.

Price Changes

A more than usual number of price changes were recorded in January. Broadly speaking, the revisions were mostly in the fertilizer and specialty fields. Heavy chemical prices were quite firm. Blood, tankage, and nitrogenous material were scarce in the East, and quotations advanced. Imported and domestic sulfate prices were weak. Despite assurances from Chile, concerning marketing plans of the government, nitrate buyers were said to be adopting a waiting attitude. "Published" prices of superphosphate declined 50 cents a ton. The market particularly in the Baltimore area has been "soft" for several months.

Alcohol Steady

Alcohol producers reported a fairly good month in anti-freeze sales. However, the retail competition between alcohol, glycerine and other anti-freeze compounds has been specially destructive. In some quarters, further declines in wholesale glycerine prices are thought likely, due to competition of foreign material. Cream of tartar was reduced a cent, but no change was announced in tartaric acid. An upward revision of tin Straits brought about a revision of the

tetrachloride. With the contract period over conditions in both bichromates and phosphates (di and tri) were quiet, but there seemed to be little or no improvement in the price structure of the phosphates.

Despite the rather slow rate of improvement in January, producers generally were optimistic. February and March are usually two very good months, and further expansion was confidently looked for in most quarters. Orders on hand assure steady withdrawals for at least the first quarter for the rayon field, seasonal improvement is looked for in the paint, lacquer and varnish industries. Very little improvement, at least in the immediate future, is anticipated in the glass or ceramic fields, because of the low rate of building activity. Plating chemicals are expected to be in better demand late in February. Some slight expansion is hoped for in tanning operations. Little change is anticipated in the basic conditions in the oils and fats until wholesale prices generally become more stable. Linseed has been particularly firm because of the decline in flaxseed acreage and receipts at mills, and may be further influenced if the Tariff Commission should make a favorable decision after the testimony taken during the past month.

Price Indices

Indices of the N. F. A. show decided decline in the fats and oils, losses in fertilizer materials and mixed fertilizers and no change in chemicals and drugs in the past month (Dec. 20-Jan. 21).

	Jan. 21 1933	*Month ago*	*Years ago*
Fats and oils	41.3	45.7	48.6
Chemicals and drugs	87.3	87.3	88.8
Fertilizer materials	60.5	61.7	70.1
Mixed fertilizers	66.0	67.9	79.1

Important Price Changes

Advances	Jan.	Dec.
Acid, sulfanilic	.15	.14½
Alphanaphthol	.65	.60
Blood, dried	1.60	1.50
Dinitrobenzol	.18	.15
Gum Copal, E. I., pale, Singapore	.07½	.08¾
Macassar, nubs	.11	.10
Gamboge, pipe	.45	.40
Powdered	.57	.50
Manila D.B.B.	.05¾	.05
M A	.05	.04¾
M B	.04½	.04
W. S.	.06¼	.06½
Linseed cake, ton	19.50	18.50
Nitrogenous mat.	1.60	1.50
Paratoluidine	.58	.48
Sumac, ground	46.00	38.00
Tankage	1.75	1.70
Tin tetrachloride	.1475	.1412½

Declines		
Aluminum oleate	.16½	.17½
Ammonium Sulfate	20.00	21.00
Arrowroot, St. Vincents	.06½	.08
Bone Meal, raw	21.00	22.00
Calcium palmitate	16.00	17.00
Calcium stearate	.14½	.16½
Camphor slabs	.37	.38
Cream of Tartar	.14½	.15½
Dibutyl phthalate	.20½	.218
Diethylaniline	.52	.55
Diphenylamine	.31	.34
Ethyl acetate, tanks	.08	.08½
Ethylene dichloride	.05	.0595
Egg albumen	.78	.80
Yolk, spray	.42	.43
Gum Arabic Amber sorts	.05¾	.06
White sorts	.11	.14
Mastic	.27	.20½
Tragacanth, No. 2	.55	.60
No. 3	.40	.43
Magnesite	46.00	50.00
Rochelle salt	.11½	.12½
Sodium bisulfide, powd.	2.75	3.00
Sodium hydrosulfide	.20	.21
Sodium silicofluoride	.04½	.05
Sodium tungstate	.57	.60
Superphosphate	6.50	7.00
Trichlorethylene	.09½	.10½
Tetrachlorethane	.08½	.09½
Waxes, Bayberry	.14½	.16
Carnauba, No. 1	.21	.22
No. 2, yellow	.20½	.21½
No. 3 N. C.	.11½	.11¾
No. 3, chalky	.12	.12¼
Japan	.05¾	.06
Spermaceti, blocks	.18	.20
Cakes	.19	.21

Acid Acetic — Textile centers were more active, and the demand for acid improved. No price change occurred. The lime market has been firm at $2.50 for a long period, and production of both acetate and acid has been held to relatively small quantities for several months, giving the market a very stable appearance. Of the 1,780,956 pounds imported in November, Canada shipped 1,780,911 pounds of acetic or pyroligneous acid, with 45 pounds coming from United Kingdom.

Acid Boric — Buying in most consuming industries was done on a very limited scale. Prices, however, were firmly held. Of the 182,034 pounds exported in November, France purchased 45,200 pounds; United Kingdom, 67,800 pounds; Canada, 20,841 pounds; Australia, 19,738 pounds, and Japan, 11,200 pounds.

Acid Chromic — Several fairly large size orders were said to have been placed early in the past month, but inquiries fell off noticeably in the last two weeks of January. Prices were fairly steady at existing price levels. Producers were concerned over the status of the Ford production.

Acid Formic — Resumption of operations in both the tanning and textile trades stimulated demand. A firm price tone continued to feature this market. Germany shipped 44,722 pounds here in November.

Acid Lactic — Improvement in tanning operations, particularly in the Northeastern section, brought forth a better demand for technical grades. Of the 39,696 pounds imported in November, Germany shipped 35,680 pounds, and Netherlands, 4,016 pounds.

Acid Muriatic — After showing a slight spurt with the turn of the year, shipments fell off. Buyers held down orders to actual needs in most instances. Of the November exports of 137,587 pounds, Cuba purchased 66,700 pounds; Dominican Republic, 39,115 pounds; Canada, 8,208 pounds; Columbia, 9,474 pounds; Ecuador, 4,160 pounds; Venezuela, 2,876 pounds, and Bolivia, 2,520 pounds.

Acid Nitric — Contract customers released a large number of requisitions with the opening of the new year, but spot business was small. The firm price tone which has prevailed in this acid for a long period continued unchanged. Of the November exports of 35,267 pounds, Canada consumed 17,767 pounds; Cuba, 14,260 pounds; Mexico, 757 pounds; Colombia, 654 pounds; Ecuador, 340 pounds, and Venezuela, 200 pounds.

Acid Oxalic — Demand was irregular during the greater part of the month with the laundry trade taking larger quantities. The price situation was unchanged, producers quoting 11-11½ cents on fair-sized orders.

Acid Sulfuric — A very slight improvement in shipments was laid to the moderate rise in steel activity. A larger number of inquiries from fertilizer producers featured an otherwise dull and uninteresting market. Prices were fairly well maintained, and with the majority of the contracts signed, the market took on a firmer tone. Conditions in the Baltimore market were reported more stable. Production of acid by makers of superphosphate during November totaled 114,045 tons, according to a preliminary estimate by the Bureau of Census. This compared with a revised estimate of 84,471 tons in October, and 99,654 tons in November, 1931. This estimate is based upon reports received from 76 fertilizer manufacturers operating 104 plants. November consumption in fertilizer manufacture was 97,189 tons, against 74,813 tons in October and 78,615 tons in the corresponding month of 1931. Stocks on hand at the end of November totaled 100,384 tons, against 88,817 tons at the end of October, and 106,564 tons at the close of November, 1931. Details of production, consumption in fertilizer manufacture, shipments and stocks on hand for November with a comparison for last year, follow:

*Short tons**

	†*Nov., 1932*	‡*Oct., 1932*	*Nov., 1931*
Produced, total	114,045	84,471	99,654
North dist.	68,164	52,625	67,640
South dist.	45,881	31,846	32,014
Purch from mfr. total	14,702	16,224	18,665
North dist.	7,950	4,440	6,886
South dist.	6,752	11,784	11,779
Purch from non-fert. mfrs. total	12,979	9,158	14,119
North dist.	5,877	3,058	9,144
South dist.	7,102	6,100	4,975
Consumed in fert— Consumed by reporting establishments in prod. of fert., total	97,189	74,813	78,615
North dist.	48,998	35,716	37,127
South dist.	48,191	39,097	41,488
Shipments— To other than fert. mfrs., total	22,805	23,579	28,311
North dist.	19,044	20,516	23,042
South dist.	3,761	3,063	5,269
To fert. mfrs., total	10,165	10,920	19,591
North dist.	5,323	5,687	17,308
South dist.	4,842	5,230	2,283
Stocks— Total	100,384	88,817	106,564
North dist.	75,969	67,343	79,902
South dist.	24,415	21,474	26,662

*North district, States north of Virginia-North Carolina line; south district, States south of Virginia-North Carolina line.
†Revised.
‡Preliminary.

Acid Tartaric — Trading in this item was comparatively light during the entire month. Competition between domestic and imported material was unchanged, although no further price reductions were announced. A downward revision was made in cream of tartar, however, the new figure for that commodity being 14½ cents. Exports of tartaric acid from Italy totaled 1,086 tons for the first nine months

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of 1932, showing a decline of 40 per cent. from the shipments in the corresponding period in 1931. Exports of cream of tartar were also off 40 per cent. because of competition. Of the November imports of 144,484 pounds, Germany shipped 89,032 pounds and Italy 55,452 pounds.

Alcohol — Consumption of anti-freeze was reported fair by leading producers, but the total is below that hoped for. The average mean temperature in N. Y. City in January was 10 degrees above last winter which was considered an exceptionally mild winter. However, quick changes in temperature aided in moving dealers' stocks. Inroads by other anti-freeze materials has been more noticeable and prices severely competitive. In the industrial field demand improved in January over the December volume. The trade was interested in the rumor that a new method of anti-freeze distribution might be adopted after March. The price schedules on C. D. 5 and S. D. 1 follows:

	Cents per gallon
*C. D. No. 5 drums, car lots	38.5
5 to 19 drums	44.5
1 to 4 drums	46.5
S. D. No. 1, tanks	30.4
drums, car lots	34.6
5 to 19 drums	40.6
20 drums	36.6
1 to 4 drums	42.6
barrels, car lots	37.6
5 to 19 barrels	43.6
1 to 4 barrels	45.6

*Credit of 1c per gallon given on purchases of car lots or more.

Aluminum Sulfate — A slight pick-up in the paper field increased January tonnages from the extremely low level of December. The price structure remained unchanged. Of the 3,117,414 pounds exported in November, Canada consumed 2,001,917 pounds; Mexico, 12,000 pounds; Cuba, 70,000 pounds; Argentina, 22,000 pounds; Brazil, 3,447 pounds, and Australia, 1,300 pounds.

Ammonia Anhydrous — Demand was of a routine nature only. The spot schedule was strictly held. Of the November exports of 41,225 pounds, British Honduras consumed 1,056 pounds; Canada, 250 pounds; Panama, 21,615 pounds; Mexico, 1,236 pounds; Bermudas, 926 pounds; Argentina, 3,790 pounds; Colombia, 3,231 pounds; Peru, 10,449 pounds; Venezuela, 1,867 pounds; China, 11,000 pounds, and Philippine Islands, 11,000 pounds.

Ammonia, Aqua — Shipments into the dyeing centers improved somewhat, but spot buyers held orders down to small lots. Offsetting this, a number of large contract consumers were said to have ordered out fairly large quantities. Prices were firm and unchanged.

Ammonium Sulfate — Price conditions were spotty during the past month. In some sections material was scarce, while in others, the direct opposite condition prevailed. Generally speaking, both imported and domestic were off $1 a ton from the December closing. While there was considerably more interest, and inquiries were numerous, actual transactions were relatively small. Fertilizer tag sales for December in 16 states where such records are kept, were 24 per cent. greater than December, 1931, according to the N. F. A.'s report, which states that December sales ordinarily represent about two per cent. of the total year's sales. Tag sales for the calendar year 1932 in the South were 64 per cent. of the 1931 sales and 47 per cent. of those for 1930. In the three mid-Western States the 1932 sales were 47 per cent. of those for 1931 and 35 per cent. of the 1930 sales. Florida sales were more than 90 per cent. of the 1931 sales. In Virginia and the Carolinas the sales ranged between 69 and 74 per cent. of the previous year. None of the other Southern States reported sales as high as 55 per cent. of the 1931 sales although Georgia. Tennessee, Missouri, Louisiana and Texas sales were all above 50 per cent. of the 1931 sales.

Fertilizer Tag Sales: 1932

	Per cent of	*Short tons December*	
South—	*1931*	*1932*	*1931*
Virginia	436	2,400	550
North Carolina	484	21,066	4,348
*South Carolina	180	10,845	6,025
Georgia	111	800	721
*Florida	98	46,922	47,950
Alabama	119	1,900	1,600
Mississippi	62	900	1,450
*Tennessee	...	2	....
Missouri	81	100	123
Arkansas	...	....	1,050
*Louisiana	9	200	2,200
*Texas	4	50	1,420
Oklahoma	...	....	....
Totals, South	126	85,185	67,437
Others—			
Indiana	126	63	50
Illinois	2	28	1,415
Kansas	18	27	153
Totals, Others	7	118	1,618
Grand totals	124	85,303	69,055

*Cottonseed meal sold as fertilizer included.

Benzol — Producers reported some fair-sized orders placed by chemical manufacturers in the last 10 days of the month. Benzol production, estimated from the production of coke at by-product ovens known to recover benzol, amounted to 4,037,000 gallons in December, being an increase of two per cent. over November, but a sharp decline from the 5,279,000 gallons recovered in same month of 1931.

Calcium Acetate — The continuance of the low rate of production held the price level firm and unchanged.

Carbon Black — With the completion of the inventory period it is reported that several of the larger Akron tire companies increased withdrawals. Despite this improvement, however, the total volume is considerably below normal with the paint industry holding commitments to very small quantities. The price structure was well maintained however. In the census of manufactures taken in 1932, by the Census Bureau, bone black, carbon black, and lampblack to the value of $10,230,287 at factory prices were manufactured in the United States in 1931, a decrease of 50.6 per cent. as compared with $20,703,698 reported for 1929, the last preceding census year. Of the 1931 total, $9,118,811 was contributed by establishments engaged primarily in the manufacture of these commodities and $1,111,476 by establishments engaged primarily in other lines of manufacture. The total is made up as follows:—Bone black, 33,214,240 pounds, valued at $1,288,298; carbon black, 280,907,000 pounds, $8,621,000; lampblack, 3,424,048 pounds, $320,989. Statistics for 1931, with comparative figures for 1929, are given in the following tables; all figures for 1931 being preliminary and subject to revision:—

	1931	*1929*
Bone black, carbon black, and lamp black, made in all industries, total value	$10,230,287	$20,703,698
Made in the bone-black, carbon-black, and lamp-black industry	$9,118,811	$18,462,283
Made as secondary products in other industries	$1,111,476	$2,241,415
Bone black—		
Pounds	33,214,240	54,277,051
Value	$1,288,298	$2,490,090
Carbon black*—		
Pounds	280,907,000	283,806,000
Value	$8,621,000	$17,028,360
Lampblack—		
Pounds	3,424,048	10,765,492
Value	$320,989	$1,185,248

*From reports of the United States Bureau of Mines.

Chlorine — Better demand was reported from both the textile and paper industries. The new $1.75 level was well maintained in spot carlot transactions. Of the November exports of 627,383 pounds, Canada purchased 588,750 pounds; China, 19,500 pounds; Philippine Islands, 4,500 pounds; Colombia, 6,700 pounds; Chile, 1,000 pounds; Cuba, 3,000 pounds; Newfoundland, and Labrador, 3,000 pounds; Mexico, 2,246 pounds; Panama 4,890 pounds and Guatemala, 1,447 pounds.

Copperas — The reported rise in steel mill activity to 19 per cent. did not have any effect on the market, and producers quoted on the $14-$14.50 per ton basis.

Copper Sulfate — Industrial business was said to be in fairly good volume, and producers were encouraged at the number of inquiries from agricultural buyers. The metal market fluctuated within a very narrow range and vitriol prices were firm and unchanged with carlots at $3.00. Of the November exports of 138,652 pounds, Canada consumed 52 pounds; Costa Rica, 450 pounds; Mexico, 5,380 pounds; Bermudas, 450 pounds; Hatii, 1,270 pounds; Argentina, 88,000 pounds; Bolivia, 30,150 pounds; Colombia, 4,130 pounds; Philippine Islands, 8,100 pounds and Cuba, 450 pounds.

Cresol — The disinfectant and chemical fields were responsible for a slight expansion in orders. No change occurred in quotations.

Glaubers Salt — Activity in textile and tanning centers speeded up shipments of crystal material. . Color produc-

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ers still held withdrawals of anhydrous to relatively small quantities. Prices for both were unchanged from last month's quotations.

Glycerin — The market, particularly in the metropolitan area, was keenly competitive, and in some quarters lower prices were rumored. In the Chicago market the tone was much firmer and little change was looked for. This disparity of conditions was attributed to the imported offerings being made in the New York market. German glycerin exports in the first eight months of 1932 were 325 tons of crude, 41 tons to U. S. and 1,805 tons of refined. Total was more than 1,500 tons less than that in the corresponding period in 1931. Imports of crude glycerin totaled 2,767 tons, compared with 1,310 tons in the 1931 period.

Magnesite — Continued poor demand from major consuming industries finally resulted in a $4 decline in the market.

Methanol — Contract withdrawals picked up shortly after the first of the year, and the end of the inventory period and sales for anti-freeze were said to be in satisfactory volume. Monthly statistics on production, shipments, and stocks of methanol and acetate of lime, based on data reported to the Bureau of the Census by 34 identical establishments, are presented in the table below. The establishments which report their operations monthly to the bureau, according to the returns for the Biennial Census of Manufactures, 1929, produced in that year 79 per cent. of the total output in the U. S. of crude methanol, 92.1 per cent. of refined methanol (from wood distillation), and 79.3 per cent. of acetate of lime.

Methanol

	Gallons 1932	
	*Oct.	Nov.
Refined—		
Wood distillation—		
Production	197,534	140,584
Shipments	159,491	195,065
Stocks, end of month	295,806	241,325
Synthetic—		
Production	571,372	531,635
Shipments	958,909	819,251
Stocks, end of month	3,442,098	3,154,482
Crude—		
Production	188,405	290,557
Shipments	264,857	269,911
Stocks, end of month	253,055	273,701
Acetate of Lime		
	Pounds	
Production	2,676,740	3,770,397
Shipments	3,756,394	2,359,849
Stocks, end of month	3,319,259	4,729,807
Wood		
	Cords	
Consumption	19,015	27,900
Stocks, end of month	320,273	306,358
Total capacity	2,609	2,609
Total operating	1,531	1,756
Shut down	1,078	853

*Revised.

Naphthalene — The market in this item has been very dull for several weeks. Aside from a fairly steady call from the dyestuffs producers little call has been reported for any of the several grades.

Naval Stores — After a very slow start after the turn of the year, demand showed definite signs of improvement. Prices rose steadily for the first three weeks, but then several rosin grades slumped slightly towards the close. Turpentine remained firm, however. A much better feeling existed throughout the trade. Smaller output and reduced stocks, largely brought about by curtailment of credit advances by the banks, have given the markets a much better tone. Foreign demand was particularly good in January, specially from Italy and the Scandinavian countries.

Phenol — The pharmaceutical and dyestuffs trades were responsible for a large part of the January shipments. A slight betterment in the plastics field was also reflected in increased orders for basic materials.

Sal Soda — Further expansion of shipments into the textile centers was reported. Otherwise the market was quiet, but with prices fairly well maintained. Of the November exports of 439,687 pounds, Canada purchased 364,020 pounds; Cuba, 38,075 pounds; Republic of Haiti, 5,484 pounds; Dominican Republic, 38,075 pounds, and Panama, 10,850 pounds.

Saltcake — Paper and glass manufacturers came into the market at frequent intervals, but the total tonnage shipped was small when compared with the same month a year ago. Imported and domestic quotations were unchanged.

Soda Ash — Producers reported as the month closed that tonnages had been larger than anticipated early in January due to unexpected increases in withdrawals by the textile and glass trades. Carlot and l.c.l. prices were unchanged. Of the November exports of 1,928,153 pounds, Argentina consumed 896,100 pounds; Mexico, 228,498 pounds; Canada, 417,098 pounds; Brazil, 20,000 pounds; Chile, 32,400 pounds; Colombia, 55,960 pounds; Union of South Africa, 28,760 pounds; Sweden, 51,850 pounds, and United King dom, 24,000 pounds.

Sodium Bichromate — With practically all 1933 contracts closed the market took on a much firmer appearance and producers held to the range, 4.4-4.75 cents per pound, depending upon quantity. Demand from the tanning and textile trades improved, but little change was noted in the color field.

Sodium Cyanide — Orders from the case-hardening and electro-plating trades held up fairly well, but did not reach the December total. With automobile dealers now stocked with new models, a slight lull is looked for in manufacturing operations in the Detroit area. The unexpected interruption in Ford production was responsible for further decline in the last few days of the month. Cyanide prices were maintained at unchanged levels, 15½-16 cents, depending upon quantity. Of the November exports of 90,386 pounds, Honduras consumed 33,286 pounds; Mexico, 33,286 pounds; Philippine Islands, 8,000 pounds; Peru, 5,360 pounds; Canada, 11,000 pounds, and British West Indies, 2,240 pounds.

Sodium Hydrosulfide — A decline of a cent was attributed to competition. The new basis is now 20 cents per pound.

Sodium Phosphate — A slight expansion in silk-weighting schedules was reflected in heavier shipments into the Paterson and Passaic districts, but the competitive position did not alter materially during the month. Conditions in the tri-salt market were quiet with the carlot quotation nominally $2.40, but this price was being shaded. Of the November exports of 396,811 pounds, Canada consumed 363,589 pounds; Spain, 11,375 pounds; Panama, 3,600 pounds; Venezuela, 4,550 pounds; Cuba, 1,300 pounds, and Netherland West Indies, 1,200 pounds.

Sodium Silicate — The market was without any outstanding news during the month. Tonnages of water-white for silk-weighting were heavier than in December, but box-board trade declined sharply. Of the November exports of 4,351,670 pounds, Canada purchased 3,999,308 pounds; Newfoundland and Labrador, 147,670 pounds; Colombia, 5,251 pounds; Philippine Islands, 4,515 pounds, and Cuba, 47,396 pounds.

Sodium Silicofluoride — A weak market, the result of rather severe competition between domestic and imported materials, brought the price down to 4½ cents.

Tin Salts — Firmer tone in the primary markets for the metal caused tetrachloride producers to revise prices generally upward. The price movement during the month was highly irregular, but a sizable net gain was recorded for the 30 day period. Slight expansion in tonnages was reported for silk-weighting operations.

Toluol — A fairly satisfactory call was made by thinners. Automobile production held up fairly well, although the rate of activity was below the December level.

FATS AND OILS

Oils and fats markets, generally speaking, passed through a very quiet period. Some improvement was noted after the close of the inventory period, but buying was largely of the hand-to-mouth variety. In the third week slight expansion in both inquiries and actual orders gave rise to feeling that definite improvement was on the way. In the final week contraction was again quite apparent. Price movements were generally within narrow limits. Further advance in linseed quotations featured the market. Chinawood was stronger, but offerings in the primary market were light. With tariff changes on several oils and fats a possibility (so-called farm allotment plan) all factors, domestic producers, importers and buyers, were inclined to adopt a waiting policy pending further definite indications of the likelihood of such changes being incorporated.

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Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1932 Average $1.64 - Jan. 1932 $1.54 - Jan. 1933 $1.76

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Acetaldehyde, drs 1c-1 wks...lb.	.18½	.21	.18½	.21	.18½	.21
Acetaldol, 50 gal dr.....lb.	.27	.31	.27	.31	.27	.31
Acetamide.....lb.	.95	1.35	.95	.35	.95	1.35
Acetanilid, tech, 150 lb bbl...lb.	....	.26	...	.26	.20	.26
Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.21	.25	.21	.25	.21	.25
Acetin, tech drums.....lb.	.30	.32	.30	.32	.30	.32
Acetone, tanks.....lb.	....	.10	...	.10	...	.10
Acetone Oil, bbls NY.....gal..	1.15	1.25	1.15	1.25	1.15	1.25
Acetyl Chloride, 100 lb cby...lb.	.55	.68	.55	.68	.55	.68
Acetylene Tetrachloride (see tetrachlorethane).....						
Acids						
Acid Abietic.....	.12	.12	.12	.12	.12	.12
Acetic, 28% 400 lb bbls c-1 wks .....100 lb.	2.65	2.75	2.65	2.75	2.40	2.75
Glacial, bbl c-1 wk....100 lb.	....	9.14	...	9.14	8.35	9.14
Glacial, tanks.....	....	8.89	...	8.89	8.10	8.89
Adipic.....	.72	.72	.72	.72	.72	.72
Anthranilic, refd, bbls.....lb.	.85	.95	.85	.95	.85	.95
Technical, bbls.....lb.	.65	.70	.65	.70	.65	.70
Battery, cbys.....100 lb.	1.60	2.25	1.60	2.25	1.60	2.25
Benzoic, tech, 100 lb bbls....lb.	.35	.45	.35	.45	.35	.45
Boric, powd, 250 lb. bbls. .....lb.	.0425	.05	.0425	.05	.0425	.07
Broenner's, bbls.....lb.	1.20	1.25	1.20	1.25	1.20	1.25
Butyric, 100% basis cbys....lb.	.80	.85	.80	.85	.80	.85
Camphoric.....lb.	....	5.25	...	5.25	.....	5.25
Chlorosulfonic, 1500 lb drums wks.....lb.	.04½	.05½	.04½	.05½	.04½	.05½
Chromic, 99½%, drs.....lb.	.11½	.12½	.11½	.12½	.11½	.14½
Chromotropic, 300 lb bbls....lb.	1.00	1.06	1.00	1.06	1.00	1.06
Citric, USP, crystals, 230 lb. bbls.....lb.	.29	.30	.29	.30	.29	.33½
Cleve's, 250 lb bbls.....lb.	.52	.54	.52	.54	.52	.54
Cresylic, 95%, dark drs NY.gal.	.40	.41	.40	.41	.40	.47
97-99%, pale drs NY.....gal.	.42	.44	.42	.44	.42	.50
Formic, tech 90%, 140 lb. cby.....lb.	.10½	.12	.10½	.12	.10½	.12
Furoic, tech., 100 lb. drums.lb.	....	.35	...	.35	.....	.....
Gallic, tech, bbls.....lb.	.60	.70	.60	.70	.60	.70
USP, bbls.....lb.	....	.74	...	.74	.....	.74
Gamma, 225 lb bbls wks.....fb	.75	77	.75	.77	.75	.80
H, 225 lb bbls wks.....lb.	.60	.65	.60	.65	.60	.65
Hydriodic, USP, 10% soln cby lb.	.50	.51	.50	.51	.59	.67
Hydrobromic, 48%, coml, 155 lb cbys wks.....lb.	.45	.48	.45	.48	.45	.48
Hydrochloric, CP, see Acid Muriatic.....						
Hydrocyanic, cylinders wks .lb.	.80	.90	.80	.90	.80	.90
Hydrofluoric, 30%, 400 lb bbls wks.....lb.	....	.06	...	.06	.....	.06
Hydrofluosilicic, 35%, 400 lb. bbls wks.....lb.	.11	.12	.11	.12	.11	.12
Hypophosphorous, 30%, USP, demijohns .....lb.	.75	.80	.75	.80	.75	.85
Lactic, 22%, dark, 500 lb bbls lb.	.04	.04½	.04	.04½	.04	.04½
44%, light, 500 lb bbls.....lb.	.11½	.12	.11½	.12	.11½	.12
Laurent's, 250 lb bbls.... ...lb.	.36	.42	.36	.42	.36	.42
Linoleic.....lb.	.16	.16	.16	.16	.16	.16
Malic, powd, kegs.....lb	.45	.60	.45	.60	.45	.60
Metanilic, 250 lb bbls.....lb	.60	.65	.60	.65	.60	.65
Mixed Sulfuric - Nitric..... tanks wks.....N unit	.06½	.07½	.06½	.07½	.07	.07½
tanks wks.....S unit	.008	.01	.008	.01	.008	.01
Monochloroacetic, tech bbl...lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls.....lb.	1.50	1.60	1.50	1.60	1.55	1.70
Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	....	1.35	...	1.35	.....	1.35
tanks, wks.....100 lb.	....	1.00	...	1.00	.....	1.00
20 degrees, cbys wks...100 lb.	....	1.45	...	1.45	.....	1.45
N & W, 250 lb bbls.....	.85	.95	.85	.95	.85	.95
Naphthionic, tech, 250 lb.....	.60	.65	.60	.65	.60	.65
Nitric, 36 deg, 135 lb cbys c-wks.....100 lb.	....	5.00	...	5.00	.....	5.00
40 deg, 135 lb cbys, c-1 wks.....100 lb.	....	6.00	...	6.00	.....	6.00
Oxalic, 300 lb bbls wks NY....lb.	.11	.11½	.11	.11½	.11	.11½
Phosphoric 50%, U. S. P.....lb.	....	.14	...	.14	.....	.14
Syrupy, USP, 70 lb drs....lb.	....	.14	...	.14	.....	.14
Picramic, 300 lb bbls.....lb.	.65	.70	.65	.70	.65	.70
Picric, kegs.....lb.	.30	.50	.30	.50	.30	.50
Pyrogallic, crystals..... .....lb.	1.40	1.45	1.40	1.45	1.45	1.60
Salicylic, tech, 125 lb bbl.....lb.	.33	.37	.33	.37	.33	.37
Sebacic, tech, drum.....lb.	.58	.58	.58	.58	.....	.....
Sulfanilic, 250 lb. bbls.....lb.	....	.15	...	.15	.14½	.16

*Credit of 1c gal on 3 carlots or more.

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95	1.60	1.95	1.60	1.95
tanks, wks, ton	....	15.00	....	15.00	.....	15.00
1500 lb dr wks.....100 lb.	1.50	1.65	1.50	1.65	1.50	1.65
60°, 1500 lb dr wks....100 lb.	1.27½	1.42½	1.27½	1.42½	1.27½	1.42½
Oleum, 20%, 1500 lb. drs 1c-1 wks.....ton	....	18.50	....	18.50	.....	18.50
40%, 1c-1 wks net.....ton	....	42.00	....	42.00	.....	42.00
Tannic, tech, 300 lb bbls...lb.	.23	.40	.23	.40	.23	.40
Tartaric, USP, gran. powd, 300 lb bbls.....lb.	.20	.21	.20	.21	.20	.25½
Tobias, 250 lb bbls.....lb.	.75	.80	.75	.80	.75	.85
Trichloroacetic bottles.....lb.	2.00	2.75	2.00	2.75	.....	2.75
Kegs.....lb.	....	1.75	....	1.75	.....	2.00
Tungstic, bbls.....lb.	1.40	1.70	1.40	1.70	1.40	1.70
Albumen, blood, 225 lb bbls...lb.	.35	.40	.35	.40	.35	.40
dark.....bbls., lb.	.10	.17	.10	.17	.10	.20
Egg, edible .....lb.	.78	.80	.78	.80	.75	.90
Technical, 200 lb cases...lb.	.62	.66	.62	.66	.62	.66
Vegetable, edible.....lb.	.60	.65	.60	.65	.60	.65
Technical.....lb.	.50	.55	.50	.55	.50	.55
Alcohol						
Alcohol Butyl, Normal, 50 gal drs c-1 wks.....lb.	....	.123	....	.123	.123	.1595
Drums, 1-c-1 wks.....lb	....	.128	....	.128	.128	.1645
Tank cars wks.....lb.	....	.113	....	.113	.113	.143
Amyl (from pentane) Tanks wks .....lb.	....	.176	....	.176	.176	.203
Capryl, tech, drums.....lb.	....	.85	....	.85	.....	.85
Diacetone, tanks.....lb.	.15¾	.16¾	.15¾	.16¾	.....	.....
Ethyl, USP, 190 pf, 50 gal. bbls.....gal.	2.53½	2.65	2.53½	2.65	2.55	2.65
Anhydrous, drums ...gal.	.54	58	.54	.58	.54	.58
No. 5. *188 pf, 50 gal. drs. drums extra.....gal.	....	.385*	....	.385*	.27	.396
No. S. D. 1, tanks .....gal.	....	.304	....	.304	.....	.....
Furfuryl, tech., 500 lb. drs.lb	....	.45	....	.45	.....	.....
Isobutyl, ref., gal. drs.....gal.	....	.75	....	.75	.....	.75
Isopropyl, ref, gal drs.....gal.	.45	.50	.45	.50	.45	.65
Propyl Normal, 50 gal dr..gal.	....	.75	....	.75	.....	.75
Aldehyde Ammonia, 100 gal drlb.	.80	.82	.80	.82	.80	.82
Alpha-Naphthol, crude, 300 lb. bbls.....lb.	.65	.70	.65	.70	.57	.65
Alpha-Naphthylamine, 350 lb. bbls.....lb.	.32	.34	.32	.34	.32	.34
Alum Ammonia, lump, 400 lb bbls, 1-c-1 wks.....100 lb.	3.00	3.25	3.00	3.25	3.00	3.25
Chrome, 500 lb casks, wks .....100 lb.	4.50	5.25	4.50	5.25	4.50	5.25
Potash, lump, 400 lb casks wks.....100 lb.	3.00	3.50	3.00	3.50	3.00	3.50
Soda, ground, 400 lb bbls wks.....100 lb.	3.50	3.75	3.50	3.75	3.50	3.75
Aluminum Metal, c-1 NY.100 lb.	22.90	24.30	22.00	24.30	22.90	24.30
Chloride Anhydrous .....lb.	.05	.09	.05	.09	.05	.09
Hydrate, 96%, light, 90 lb. bbls.....lb.	.15	.16½	.15	.16½	.15	.17
Stearate, 100 lb bbls.....lb.	.14	.17	.14	.17	.15	.21
Sulfate, Iron, free, bags c-1 wks.....100 lb.	1.90	1.95	1.90	1.95	1.90	1.95
Coml, bags c-1 wks .100 lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminoazobenzene, 110 lb kegs lb.	....	1.15	....	1.15	.....	1.15
Ammonia						
Ammonia anhydrous Com. tanks	....	.05	....	.05	.05	.05½
Ammonia, anhyd. 100 lb cyl...lb.	.15½	.15½	.15½	.15½	.15½	.15½
Water, 26°, 800 lb dr del...lb.	.02½	.03	.02½	.03	.02½	.03
Ammonia, aqua 26° tanks.... NH cont.....	....	.05	.....	.05	.....	.....
Ammonium Acetate .....lb.	.26	.33	.26	.33	.26	.39
Bicarbonate, bbls., f.o.b. plant .....100 lb.	....	5.15	....	5.15	.....	5.15
Bifluoride, 300 lb bbls.....lb.	.14½	.17	.14½	.17	.14½	.22
Carbonate, tech, 500 lb cs..lb.	.08	.12	.08	.12	.08	.12
Chloride, white, 100 lb. bbls wks .....100 lb.	4.45	4.90	4.45	4.90	4.45	5.15
Gray, 250 lb bbls wks...lb.	5.25	5.75	5.25	5.75	5.25	5.75
Lump, 500 lb cks spot...lb.	.10½	.11	.10½	.11	.10½	.11½
Lactate, 500 lb bbls.....lb.	.15	.16	.15	.16	.15	.16
Linoleate.....lb.	....	.11	....	.11	.11	.15
Nitrate, tech, casks.....lb.	.06	.10	.06	.10	.06	.10
Oleate, drs.....lb.	....	.10	....	.10	.....	.10
Persulfate, 112 lb kegs.....lb.	.20	.22½	.20	.22½	.20	.27½
Phosphate, tech, powd, 325 lb. bbls.....lb.	.08½	.11½	.08½	.11½	.08½	.12
Sulfate, bulk c-1.....100 lb.	..	1.00	....	1.00	.90	1.40
Sulfocyanide, kegs.....lb.	.36	.48	.36	.48	.36	.48

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MAKERS OF PHOSPHATES

		Current Market	1933 Low	1933 High	1932 Low	1932 High
Amyl Acetate, (from pentane)						
Tanks del.	lb.	....	.13½	...	.13½	.157	.17½
Tech., drs del.	lb.	.138	.149	.138	.149	.17½	.18
Amyl Alcohol, see Fusel Oil							
Furoate, 1 lb tins	lb.	.....	5.00	...	5.00	.....	5.00
Aniline Oil, 960 lb drs & tks.	lb.	.14½	.16	.14½	.16	.14½	.16
Annatto, fine	lb.	.34	.37	.34	.37	.34	.37
Anthraquinone, sublimed, 125 lb. bbls	lb.	....	.45	...	.45	.45	.55
Antimony, metal slabs, ton lots	lb.	.05½	.06	.05½	.06	.05	.06½
Needle, powd, bbls	lb.	.07	.08	.07	.08	.08½	.09
Chloride, soln (butter of) cbys	lb.	.13	.17	.13	.17	.13	.17
Oxide, 500 lb bbls	lb.	.07½	.08¾	.07½	.08¾	.07½	.08¾
Salt, 63% to 65%, tins	lb.	.20	.23	.20	.23	.20	.24
Sulfuret, golden, bbls	lb.	.16	.20	.16	.20	.16	.20
Vermillion, bbls	lb.	.38	.42	.38	.42	.38	.42
Archil, conc, 600 lb bbls	lb.	.20	.21	.20	.21	.17	.21
Double, 600 lb bbls	lb.	.16	.17	.16	.17	.16	.17
Triple, 600 lb bbls	lb.	.16	.17	.16	.17	.16	.17
Argols, 80%, casks	lb.	.12½	.13	.12½	.13	.12½	.13
Crude, 30%, casks	lb.	.07	.07½	.07	.07½	.07	.07½
Aroclors, wks	lb.	.18	.30	.18	.30	.18	.40
Arsenic, Red. 224 lb kegs, cs.	lb.	.09¾	.10	.09¾	.10	.09¾	.10
White, 112 lb kegs	lb.	.04	.05	.04	.05	.04	.05
Asbestine, c-1 wks	ton	13.00	15.00	13.00	15.00	.....	15.00
Barium							
Barium Carbonate, 200 lb bags wks	ton	38.00	58.50	38.00	58.50	47.00	57.00
Chlorate, 112 lb kegs NY	lb.	.13¾	.14¾	.13¾	.14¾	.13¾	.15
Chloride, 600 lb bbl wks	ton	63.00	69.00	63.00	69.00	63.00	69.00
Dioxide, 88%, 690 lb drs	lb.	.11	.13	.11	.13	.11	.13
Hydrate, 500 lb bbls	lb.	.04½	.05	.04½	.05	.04½	.05½
Nitrate, 700 lb casks	lb.	.....	.07½	...	.07½	.07	.08
Barytes, Floated, 350 lb bbls wks	ton	22.20	30.50	22.20	30.50	22.00	24.00
Bauxite, bulk, mines	ton	5.00	6.00	5.00	6.00	5.00	6.00
Bayberry, bags	lb.	.14½	.16	.14½	.16	.....	.....
Beeswax, Yellow, crude bags	lb.	.13½	.14	.13½	.14	.14½	.24
Refined, cases	lb.	.20	.21	.20	.21	.20	.28
White, cases	lb.	.30	.32	.30	.32	.30	.36
Benzaldehyde, technical, 945 lb. drums wks	lb.	.60	.65	.60	.65	.60	.65
Benzene, 90%, Industrial, 8000 gal tanks wks	gal.	.....	.20	...	.20	.....	.20
Ind. Pure, tanks works	gal.	.....	.20	...	.20	.....	.20
Benzidine Base, dry, 250 lb. bbls	lb.	.65	.67	.65	.67	.65	.67
Benzoyl, Chloride, 500 lb drs	lb.	.40	.45	.40	.45	.40	.47
Benzyl Chloride, tech drs	lb.	.....	.30	...	.30	.....	.30
Beta-Naphthol, 250 lb bbl wk	lb.	.....	.22	...	.22	.....	.22
Naphthylamine, sublimed, 200 lb bbls	lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls	lb.	.53	.58	.53	.58	.53	.58
Blanc Fixe, 400 lb bbls wks.	ton	60.00	75.00	60.00	75.00	60.00	80.00
Bleaching Powder, 800 lb drs c-1 wks contract	100 lb.	1.75	2.00	1.75	2.00	1.75	2.00
Blood, Dried, fob, NY	Unit	1.55	1.70	1.55	1.70	1.20	1.90
Chicago	Unit	1.15	1.25	1.15	1.25	1.50	1.60
S. American shipt	Unit	1.80	2.00	1.80	2.00	2.00	2.25
Blues, Bronze Chinese Milori Prussian Soluble	lb.	.....	.35	...	.35	.....	.35
Bone, raw, Chicago	ton	19.00	21.00	19.00	21.00	20.00	22.00
Bone Ash, 100 lb kegs	lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls	lb.	.06	.08½	.06	.08½	.05½	.08½
Meal, 3% & 50%, Imp.	ton	18.00	19.00	18.00	19.00	20.00	23.00
Borax, bags	lb.	.018	.02	.018	.02	.018	.03½
Bordeaux, Mixture, 16% pwd.	lb.	.11½	.13	.11½	.13	.11½	.13
Paste, bbls	lb.	.11½	.13	.11½	.13	.11½	.13
Brazilwood, sticks, shpmt	lb.	26.00	28.00	26.00	28.00	26.00	28.00
Bromine, cases	lb.	.36	.43	.36	.43	.36	.43
Bronze, Aluminum, powd blk.	lb.	.50	.75	.50	.75	.60	1.20
Gold bulk	lb.	.40	.55	.40	.55	.55	1.25
Butanes, com 16.32° group 3 tanks	lb.	.....	.04	....	.04	.....	.....
Butyl, Acetate, normal drs.	lb.	.134	.139	.134	.139	.134	.166
Tank, wks	lb.	.....	.124	....	.124	.124	.143
Aldehyde, 50 gal drs wks.	lb.	.31½	.36	.31½	.36	.31½	.36
Carbitol see Diethylene Glycol Mono (Butyl Ether)		.....	.....	.....	.....	.....	.....
Cellosolve (see Ethylene glycol mono butyl ether)							
Furoate, tech., 50 gal. dr.	lb.	.....	.50	....	.50	.....	.50
Propionate, drs	lb.	.20	.22	.20	.22	.20	.25
Stearate, 50 gal drs.	lb.	.25	.25½	.25	.25½	.25	.25½
Tartrate, drs	lb.	.55	.60	.55	.60	.55	.60
Cadmium, Sulfide, boxes	lb.	.65	.75	.65	.75	.65	.90
Calcium, Acetate, 150 lb bags c-1	100 lb.	.....	2.50	....	2.50	2.00	2.50
Arsenate, 100 lb bbls c-1 wks	lb.	.05½	.06	.05½	.06	.05½	.06
Carbide, drs	lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bags c-1	lb.	1.00	1.00	1.00	1.00	1.00	1.00
Chloride, Flake, 375 lb drs c-1 wks	ton	.....	21.00	....	21.00	.....	21.00
Solid, 650 lb drs c-1 fob wks	ton	.....	18.00	....	18.00	.....	18.00
Calcium Furoate, tech, 100 lb. drums	lb.	.....	.30	....	.30	.....	.30
Nitrate, 100 lb bags	ton	24.00	26.00	24.00	26.00	34.00	35.00
Palmitate, bbls	lb.	.16	.19	.16	.19	.....	.....
Peroxide, 100 lb drs	lb.	.....	1.25	....	1.25	.....	1.25
Phosphate, tech, 450 lb bbls.	lb.	.07½	.08	.07½	.08	.07½	.08½
Stearate, 100 lb. bbls	lb.	.14	.16	.14	.16	.16	.18
Camphor, slabs	lb.	.35½	.36	.35½	.36	.....	.....
Powder	lb.	.38	.40	.38	.40	.....	.....
Camwood, Bark, ground bbls.	lb.	.16	.18	.16	.18	.16	.18
Candelilla Wax, bags	lb.	.10	.11	.10	.11	.10	.14
Carbitol, (See Diethylene Glycol Mono Ethyl Ether)		.....	.....	....	...	.....	.....
Carbon, Decolorizing, drums c-1	lb.	.08	.15	.08	.15	.08	.15
Black, 100-300 lb cases 1c-1 NY	lb.	.06	.12	.06	.12	.06	.12
Bisulfide, 500 lb drs 1c-1 NY	lb.	.05½	.06	.05½	.06	.05½	.06
Dioxide, Liq. 20-25 lb cyl.	lb.	.....	.06	....	.06	.....	.06
Tetrachloride, 1400 lb drs delivered	lb.	.06½	.07	.06½	.07	.06½	.07
Carnauba Wax, Flor, bags	lb.	.23	.24	.23	.24	.23	.28
No. 1 Yellow, bags	lb.	.21	.22	.21	.22	.21	.24
No. 2 N Country, bags	lb.	.14	.15	.14	.15	.13	.16
No. 2 Regular, bags	lb.	.20½	.21	.20½	.21	.20	.24
No. 3 N. C.	lb.	.11½	.12	.11½	.12	.11	.13
No. 3 Chalky	lb.	....	.12	....	.12	.11	.13
Casein, Standard, Domestic ground	lb.	.07	.07½	.07	.07½	.04¾	.07½
Cellosolve (see Ethylene glycol mono ethyl ether)							
Acetate (see Ethylene glycol mono ethyl ether acetate)							
Celluloid, Scraps, Ivory cs	lb.	.....	.15	....	.15	.13	.15
Shell, cases	lb.	.18	.20	.18	.20	.18	.20
Transparent, cases	lb.	.....	.16	....	.16	.....	.15
Cellulose, Acetate, 50 lb kegs.	lb.	.80	.90	.80	.90	.80	.90
Chalk, dropped, 175 lb bbls.	lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks.	lb.	.02	.03¾	.02	.03¾	.02	.03¾
Light, 250 lb casks	lb.	.02½	.03¾	.02½	.03¾	.02½	.03¾
Charcoal, Hardwood, lump, bulk wks	bu.	.18	.19	.18	.19	.18	.19
Willow, powd, 100 lb bbl. wks	lb.	.06	.06½	.06	.06½	.06	.06½
Wood, powd, 100 lb bbls.	lb.	.04	.05	.04	.05	.04	.05
Chestnut, clarified bbls wks.	lb.	.01¾	.02	.01¾	.02	.01¾	.02
25% tks wks	lb.	.012	.01¾	.012	.01¾	.01¾	.02¾
Powd, 60%, 100 lb bgs wks.	lb.	.....	.04¾	....	.04¾	.....	.04¾
Powd, decolorized bgs wks.	lb.	.04¾	.05	.04¾	.05	.04¾	.06
China Clay, lump, blk mines.	ton	8.00	9.00	8.00	9.00	8.00	9.00
Powdered, bbls	lb.	.01	.02	.01	.02	.01	.02
Pulverized, bbls wks	ton	10.00	12.00	10.00	12.00	10.00	12.00
Imported, lump, bulk	ton	15.00	25.00	15.00	25.00	15.00	25.00
Chlorine							
Chlorine, cyls 1c-1 wks contract	lb.	.07	.08½	.07	.08½	.07	.08½
cyls, cl., contract	lb.	.....	.05½†	....	.05½†	....	.05½
Liq tank or multi-car lot cyls wks contract	100 lb.	.....	1.75	....	1.75	1.55	1.75
Chlorobenzene, Mono, 100 lb. drs 1c-1 wks	lb.	.06	.07½	.06	.07½	.06	.10½
Chloroform, tech, 1000 lb drs.	lb.	.15	.16	.15	.16	.15	.16
Chloropicrin, comml cyls	lb.	1.00	1.35	1.00	1.35	1.00	1.35
Chrome, Green, CP	lb.	.23	.29	.23	.29	.23	.29
Commercial	lb.	.06½	.10	.06½	.10	.06½	.11
Yellow	lb.	.14	.15	.14	.15	.14	.18
Chromium, Acetate, 8% Chrome bbls	lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
20° soln, 400 lb bbls	lb.	.....	.05½	....	.05½	.....	.05½
Fluoride, powd, 400 lb bbl.	lb.	.27	.28	.27	.28	.27	.28
Oxide, green, bbls	lb.	.28	.33	.28	.33	.28	.35½
Coal tar, bbls	bbl.	8.00	9.00	8.00	9.00	10.00	10.50
Cobalt Oxide, black, bags	lb.	1.15	1.25	1.15	1.25	1.15	1.45
Cochineal, gray or black bag.	lb.	.36	.42	.36	.42	.38	.57
Teneriffe silver, bags	lb.	.37	.43	.37	.43	.39	.57
Copper, metal, electrol.	100 lb.	....	5.00	....	5.00	5.05	7.25
Carbonate, 400 lb bbls	lb.	.07	.15½	.07	.15½	.07	.16½
Chloride, 250 lb bbls	lb.	.17	.18	.17	.18	.17	.25
Cyanide, 100 lb drs	lb.	.39	.40	.39	.40	.39	.40
Oxide, red, 100 lb bbls	lb.	.14¾	.15	.14¾	.15	.15	.16
Sub-acetate verdigris, 400 lb bbls	lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls c-1 wks	100 lb.	.....	3.00	....	3.00	2.75	3.10
Copperas, crys and sugar bulk c-1 wks bags	ton	14.00	14.50	14.00	14.50	14.00	14.50
Cotton, Soluble, wet, 100 lb bbls	lb.	.40	.42	.40	.42	.40	.42
Cottonseed, S. E. bulk c-1	ton	.....	26.50	....	26.50	.....	26.50
Meal S. E. bulk	ton	.....	.....	...	...	.....	.....
7% Amm., bags mills	ton	13.25	38.00	13.25	38.00	13.25	38.00
Cream Tartar, USP, 300 lb. bbls	lb.	.14½	.15	.14½	.15	.15½	.20½
Creosote, USP, 42 lb cbys	lb.	.40	.42	.40	.42	.40	.42
Oil, Grade 1 tanks	gal.	.11	.12	.11	.12	.11	12½
Grade 2	gal.	.10	.11	.10	.11	.10	.11½
Grade 3	gal.	.09	.11	.09	.11	.09	.11½
Cresol, USP, drums	lb.	.10½	.11	.10½	.11	.10½	.11
Crotonaldehyde, 50 gal dr.	lb.	.32	.36	.32	.36	.32	.36
Cudbear, English	lb.	.16	.17	.16	.17	.16	.17
Cutch, Rangoon, 100 lb bales.	lb.	.05½	.07	.05½	.07	.08¾	.12
Borneo, Solid, 100 lb bale	lb.	.02½	.03	.02½	.03	.03	.07
Cyanamide, bags c-1 frt allowed Ammonia unit		.....	.97½	....	.97½	.....	.97½
Dextrin, corn, 140 lb bags.	100 lb.	.....	2.99	....	2.99	2.99	3.67
White, 140 lb bags	100 lb.	.....	2.94	....	2.94	2.94	3.37
Potato Yellow, 220 lb bgs.	lb.	.08	.09	.08	.09	.08	.09
White, 220 lb bags 1c-1	lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 lb bags 1c-1.	lb.	.07	.08	.07	.08	.07	.08½
Diamylphthalate, drs wks.	gal.	.....	3.80	....	3.80	.....	3.80
Dianisidine, barrels	lb.	2.35	2.70	2.35	2.70	2.35	2.70
Dibutylphthalate, wks	lb.	.20½	.21	.20½	.22	.218	.23½
Dibutyltartrate, 50 gal drs.	lb.	.29½	.31½	.29½	.21	.29½	.31½
Dichloroethylether, 50 gal drs	lb.	.....	.16	....	.16	.....	.16

†F. O. B. destination, 1931 prices are works prices.

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UNITED STATES POTASH CO.

342 Madison Ave., New York

		Current Market	1933 Low	1933 High	1932 Low	1932 High
Dichloromethane, drs wks	lb.	.55	.65	.55	.65	.55	.65
Diethylamine, 400 lb drs	lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylcarbonate, drs	gal.	1.85	1.90	1.85	1.90	1.85	1.90
Diethylaniline, 850 lb drs	lb.	.52	.55	.52	.55	.55	.60
Diethyleneglycol, drs	lb.	.14	.16	.14	.16	.14	.16
Mono ethyl ether, drs	lb.	.15	.16	.15	.16	.15	.16
Mono butyl ether, drs	lb.	.....	.26	....	.26	.24	.30
Diethylene oxide, 50 gal drs	lb.	.26	.27	.26	.27	.....	.....
Diethylorthotoluidin, drs	lb.	.64	.67	.64	.67	.64	.67
Diethyl phthalate, 1000 lb. drums	lb.	.23	.26	.23	.26	.23	.26
Diethylsulfate, technical, 50 gal drums	lb.	...	....	....	....	.30	.35
Dimethylamine, 400 lb drs	lb.	.....	2.62	....	2.62	.....	2.62
Dimethylaniline, 340 lb drs	lb.	.25	.27	.25	.27	.25	.27
Dimethylsulfate, 100 lb drs	lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls	lb.	.....	.18	....	.18	.15	.16
Dintrochlorobenzene, 400 lb bbls	lb.	.13	.15	.13	.15	.13	.15
Dinitronaphthalene, 350 lb bbls	lb.	.34	.37	.34	.37	.34	.37
Dinitrophenol, 350 lb bbls	lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls	lb.	.16	.17	.16	.17	.16	.17
Dioxan (See Diethylene Oxide)		.....	.....	...	...	.....	.....
Diphenyl	lb.	.20	.40	.20	.40	.20	.40
Diphenylamine	lb.	.31	.34	.31	.34	.34	.37
Diphenylguanidine, 100 lb bbl	lb.	.30	.35	.30	.35	.30	.35
Dip Oil, 25%, drums	lb.	.23	.25	.23	.25	.26	.30
Divi Divi pods, bgs shipmt	ton	26.00	28.00	26.00	28.00	26.00	30.00
Extract	lb.	.05	.05½	.05	.05½	.05	.05½
Egg Yolk, 200 lb cases	lb.	.42	.43	.42	.43	.40	.52
Epsom Salt, tech, 300 lb bbls c-1 NY	100 lb.	.....	2.20	....	2.20	1.70	1.90
Ether, USP anaesthesia 55 lb. drs.	lb.	.22	.23	.22	.23	.22	.23
(Conc)	lb.	.09	.10	.09	.10	.09	.10
Ethyl Acetate, 85% Ester tanks	lb.	.08	.09	.08	.09	.08½	.09
drums	lb.	.09	.10	.09	.10	.09½	.10
Anhydrous, tanks	lb.	.09	.10	.09	.10	.....	.10
drums	lb.	.10	.10¼	.10	.10¼	.....	.10½
Acetoacetate, 50 gal drs	lb.	.65	.68	.65	.68	.65	.68
Benzylaniline, 300 lb drs	lb.	.88	.90	.88	.90	.88	.90
Bromide, tech, drums	lb.	.50	.55	.50	.55	.50	.55
Carbonate, 90%, 50 gal drs	gal.	1.85	1.90	1.85	1.90	1.85	1.90
Chloride, 200 lb drums	lb.	.....	.22	....	.22	.....	.22
Chlorocarbonate, cbys	lb.	.....	.30	....	.30	.....	.30
Ether, Absolute, 50 gal drs	lb.	.50	.52	.50	.52	.50	.52
Furoate, 1 lb tins	lb.	.....	5.00	....	5.00	.....	5.00
Lactate, drums works	lb.	.25	.29	.25	.29	.25	.29
Methyl Ketone, 50 gal drs	lb.	.....	.30	....	.30	.....	.30
Oxalate, drums works	lb.	.37½	.55	.37½	.55	.37½	.55
Oxybutyrate, 50 gal drs wks	lb.	.....	.30½	....	.30½	.....	.30½
Ethylene Dibromide, 60 lb dr.	lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys. chloro, cont	lb.	.75	.85	.75	.85	.75	.85
Dichloride, 50 gal drums	lb.	.05	.09	.05	.09	.0595	.07
Glycol, 50 gal drs wks	lb.	.25	.28	.25	.28	.25	.28
Mono Butyl Ether drs wks		.....	.20	....	.20	.20	.24
Mono Ethyl Ether drs wks		.15	.17	.15	.17	.15	.20
Mono Ethyl Ether Acetate dr. wks		.16½	.18	.16½	.18	.16½	.23
Mono Methyl Ether, drs.	lb.	.21	.23	.21	.23	.21	.23
Stearate		.18	.18	.18	.18	.18	.18
Oxide, cyl	lb.	.....	.75	....	.75	.75	2.00
Ethylidenaniline	lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, bulk	ton	15.00	20.00	15.00	20.00	15.00	20.00
Powdered, bulk works	ton	15.00	21.00	15.00	21.00	15.00	21.00
Ferric Chloride, tech, crystal 475 lb bbls	lb.	.04½	.07	.04½	.07	.04½	.07½
Fish Scrap, dried, wks	unit	.....	1.85*	....	1.85*	1.60	3.00
Acid, Bulk 7 & 3½% delivered Norfolk & Balt. basis	unit	.....	2.00†	....	2.00†	1.40	2.40
Fluorspar, 98%, bags		28.00	35.50	28.00	35.50	28.00	46.00

*& 10; †& 50

Formaldehyde

Formaldehyde, aniline, 100 lb. drums	lb.	.....	.....	.....	.....	.....	.....
USP, 400 lb bbls wks	lb.	.37½	.42	.37½	.42	.37½	.42
Fossil Flour	lb.	.06	.07¾	.06	.07¼	.06	.07¾
Fullers Earth, bulk, mines	ton	.02½	.04	.02½	.04	.02½	.04
Imp. powd c-1 bags	ton	15.00	20.00	15.00	20.00	15.00	20.00
Furfural (tech.) drums wks,	lb.	24.00	30.00	24.00	30.00	24.00	30.00
Furfuramide (tech) 100 lb dr.	lb.	.....	.10	....	.10	.....	.10
Furfuryl Acetate, 1 lb tins	lb.	.....	.30	....	.30	.....	.30
Fusel Oil, 10% impurities	lb.	.....	5.00	....	5.00	.....	5.00
Fustic, chips	lb.	.04	.14½	....	.14½	.....	.....
Crystals, 100 lb boxes	lb.	.18	.05	.04	.05	.04	.05
Liquid 50°, 600 lb bbls	lb.	.07	.20	.18	.20	.18	.20
Solid, 50 lb boxes	lb.	.14	.08	.07	.08	.07	.08
Sticks	ton	25.00	.16	.14	.16	.14	.16
G Salt paste, 360 lb bbls	lb.	.42	26.00	25.00	26.00	25.00	26.00
Gall Extract	lb.	.18	.43	.42	.43	.42	.50
Gambier, common 200 lb cs.	lb.	.06	.20	.18	.20	.18	.20
25% liquid, 450 lb bbls	lb.	.08	.07	.06	.07	.06½	.07
Singapore cubes, 150 lb bg.	lb.	.06	.10	.08	.10	.08	.10
Gelatin, tech, 100 lb cases	lb.	.45	.07	.06	.07	.07¾	.09
Glauber's Salt, tech, c-1 wks.	100 lb.	1.00	.50	.45	.50	.45	.50
Glucose (grape sugar) dry 70-80° bags c-1 NY	100 lb.	3.24	1.70	1.00	1.70	1.00	1.70
Tanner's Special, 100 lb bags	100 lb.	.....	3.34	3.24	3.34	3.24	3.34
			2.33	....	2.33	2.36	2.75

		Current Market	1933 Low	1933 High	1932 Low	1932 High
Glue, medium white, bbls	lb.	.12	.13	.12	.13	.15½	.20
Pure white, bbls	lb.	.18	.20	.18	.20	.18	.27
Glycerin, CP, 550 lb drs	lb.	.....	.10½	....	.10½	.09¾	.11½
Dynamite, 100 lb drs	lb.	.....	.07½	....	.07½	.07½	.09¾
Saponification, tanks	lb.	.....	.05	....	.05	.04½	.06¼
Soap Lye, tanks	lb.	.04	.04¾	.04	.04¾	.03¾	.05
Glyceryl Stearate, bbls	lb.	.....	.17	....	.17	.....	.17
Graphite, crude, 220 lb bgs	ton	12.00	23.00	12.00	23.00	12.00	35.00
Flake, 500 lb bbls	lb.	.05	.06	.05	.06	.05	.09

Gums

Gum Accroides, Red, coarse and fine 140-150 lb bags	lb.	.03¾	.04½	.03¾	.04½	.03¾	.04¼
Powd, 150 lb bags	lb.	.06	.06½	.06	.06½	.06	.06½
Yellow, 150-200 lb bags	lb.	.18	.20	.18	.20	.18	.20
Animi (Zanzibar) bean & pea 250 lb cases	lb.	.35	.40	.35	.40	.35	.40
Glassy, 250 lb cases	lb.	.50	.55	.50	.55	.50	.55
Arabic, amber sorts	lb.	.05¾	.06	.05¾	.06	.....	.....
Asphaltum, Barbadoes (Manjak) 200 lb bags	lb.	.04	.05	.04	.05	.04	.06
Egyptian, 200 lb cases	lb.	.13	.15	.13	.15	.13	.15
Gamboge, pipe, cases	lb.	.....	.45	.42	.45	.....	.....
Powdered, bbls	lb.	.....	.57	.50	.57	.....	.....
Gilsonite Selects, 200 lb bags	ton	30.50	32.90	30.50	32.90	30.50	32.90
Damar Batavia standard 136, lb. cases	lb.	.08½	.09	.08½	.09	.08½	.09
Batavia Dust, 160 lb bags	lb.	.04	.05	.04	.05	.04	.05½
E Seeds, 136 lb cases	lb.	.05½	.06	.05½	.06	.05½	.06½
F Splinters, 136 lb cases and bags	lb.	.05½	.06	.05½	.06	.05½	.06
Singapore, No. 1, 224 lb cases	lb.	.09½	.10	.09½	.10	.10½	.11
No. 2, 224 lb cases	lb.	.....	.07	....	.07	.06	.07½
No. 3, 180 lb bags	lb.	.04½	.05	.04½	.05	.04½	.05
Benzoin Sumatra, U. S. P. 120 lb. cases	lb.	....	.20	....	.20	.18	.22
Copal Congo, 112 lb bags, clean opaque	lb.	.16½	.17	.16½	.17	.16½	.17
Dark, amber	lb.	.06	.07	.06	.07	.06	.07
Light, amber	lb.	.08	.08½	.08	.08½	.08	.09
Water, white	lb.	.37	.45	.37	.45	.37	.45
Mastic	lb.	.26½	.27	.26½	.27	.26½	.40
Manila 180-190 lb baskets							
Loba A	lb.	.09	.10	.09	.10	.09	.11
Loba B	lb.	.08	.08½	.08	.08½	.08	.08½
Loba C	lb.	.07	.08	.07	.08	.07	.08
M A Sorts	lb.	.05	.05¼	.05	.05¼	.04¾	.05
D B B Chips	lb.	.05½	.06	.05½	.06	.05	.06½
East Indies chips, 180 lb bags	lb.	.04½	.05	.04½	.05	.04½	.05½
Pale bold, 224 lb cs.	lb.	.05½	.06	.05½	.06	.06	.08
Pale nubs, 180 lb bags	lb.	.03½	.04	.03½	.04	.03½	.05
Pontianak, 224 lb cases							
Bold gen No. 1	lb.	.14	.15	.14	.15	.14	.16
Gen. chips spot	lb.	.06¾	.07	.06¾	.07	.05	.08
Elemi, No. 1, 80-85 lb cs.	lb.	.09	.09½	.09	.09½	.09	.09½
No. 2, 80-85 lb cases	lb.	.08½	.09	.08½	.09	.08½	.09
No. 3, 80-85 lb cases	lb.	.08	.08½	.08	.08½	.08	.08½
Kauri, 224-226 lb cases No. 1	lb.	.20	.25	.20	.25	.20	.42
No. 2 fair pale	lb.	.12½	.16	.12½	.16	.12½	.30
Brown Chips, 224-226 lb. cases	lb.	.10	.12	.10	.12	.10	.12
Bush Chips, 224-226 lb. cases	lb.	.22	.24	.22	.24	.22	.24
Pale Chips, 224-226 lb cases	lb.	.11	.14	.11	.14	.11	.14
Sandarac, prime quality, 200 lb bags & 300 lb casks	lb.	.23	.23¼	.23	.23½	.23	.25½
Tragacanth, No. 1 bags	lb.	.70	.75	.70	.75	.....	.....
Helium, 1 lit. bot	lit.	.....	25.00	....	25.00	.....	25.00
Hematine crystals, 400 lb bbls	lb.	.10	.18	.10	.18	.10	.18
Paste, 500 bbls	lb.	.....	.11	....	.11	.....	.11
Hemlock 25%, 600 lb bbls wks	lb.	.03½	.04½	.03½	.04½	.03	.04½
Bark	ton	.....	16.00	....	16.00	.....	16.00
Hexalene, 50 gal drs wks	lb.	.....	.30	....	.30	.30	.40
Hexamethylenetetramine, drs	lb.	.46	.47	.46	.47	.46	.47
Hoof Meal, f.o.b. Chicago	unit	.75	.80	.75	.80	.75	1.35
South Amer. to arrive	unit	.....	1.45	....	1.45	1.25	1.65
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.20	.21	.20	.21	.20	.21
Hydroxyamine Hydrochloride	lb.	.....	3.15	....	3.15	.....	3.15
Hypernic, 51°, 600 lb bbls	lb.	.11	.12	.11	.12	.11	.12

Indigo

Indigo Madras, bbls	lb.	1.25	1.30	1.25	1.30	1.25	1.30
20% paste, drums	lb.	.15	.18	.15	.18	.15	.18
Synthetic, liquid	lb.	.....	.12	....	.12	.....	.12
Iron Chloride see Ferric or Ferrous							
Iron Nitrate, kegs	lb.	.09	.10	.09	.10	.09	.10
Coml, bbls	100 lb.	2.50	3.25	2.50	3.25	2.50	3.25
Oxide, English	lb.	.04	.10	.04	.10	.04	.10
Japan Wax, 224 lb cases	lb.	.05¾	.06	.05¾	.06	.06	.09
Kieselguhr, 95 lb bgs NY							
Brown	ton	60.00	70.00	60.00	70.00	60.00	70.00
Lead Acetate, bbls wks	100 lb.	9.00	9.50	9.00	9.50	9.00	10.00
White crystals, 500 lb bbls wks	100 lb.	10.00	10.50	10.00	10.50	10.00	11.00
Arsenate, drs 1c-1 wks	lb.	.09	.10½	.09	.10½	.09½	.13
Dithiofuroate, 100 lb dr	lb.	.....	1.00	....	1.00	.....	1.00
Metal, c-1 NY	100 lb.	.....	3.00	....	3.00	2.70	3.75
Nitrate, 500 lb bbls wks	lb.	.10½	.14	.10½	.14	.10½	.14
Oleate, bbls	lb.	.15	.16	.15	.16	.15	.18

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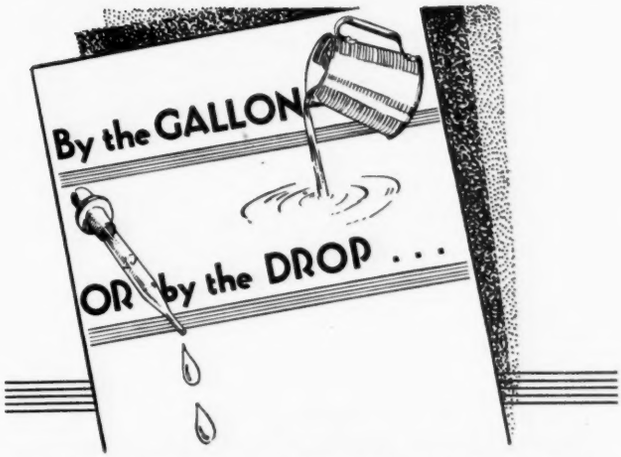

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	Current Market	1933 Low	1933 High	1932 Low	1932 High
Lead Oxide Litharge, 500 lb. bbls.	lb. .05½	.06	.05½	.06	.05½	.07
Red, 500 lb bbls wks	lb. .06½	.07	.06½	.07	.06½	.07
White, 500 lb bbls wks	lb. .06	.07	.06	.07	.06	.07
Sulfate, 500 lb bbls wk	lb. .05½	.05¾	.05½	.05¾	.05½	.06
Leuna saltpetre, bags c.i.f.	ton	Nom.	....	Nom	.....	Nom.
S. points c.i.f.	ton	Nom.	....	Nom.	.....	Nom.
Lime, ground stone bags	ton	4.50	....	4.50	.....	4.50
Live, 325 lb bbls wks	100 lb	1.05	....	1.05	.....	1.05
Lime Salts, see Calcium Salts						
Lime-Sulfur soln bbls	gal. .15	.17	.15	.17	.15	.17
Linseed cake, bulk	ton	19.50	19.00	19.50	.....	.....
Lithopone, 400 lb bbls le-1 wks	lb. .04½	.05	.04½	.05	.04½	.05
Logwood, 51°, 600 lb bbls	lb. .05	.08	.05	.08	.05	.08
Chips, 150 lb bags	lb. .03	.03½	.03	.03½	.03	.03½
Solid, 50 lb boxes	lb. .08	.12½	.08	.12½	.08	.12½
Sticks	ton 24.00	26.00	24.00	26.00	24.00	26.00
Madder, Dutch	lb. .22	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl	ton 46.00	56.00	46.00	56.00	50.00	60.00

Magnesium

Magnesium Carb, tech, 70 lb. bags NY	lb. .05½	.06½	.05½	.06½	.05½	.06½
Chloride flake, 375 lb. drs c-l wks	ton 34.00	36.00	34.00	36.00	35.00	36.00
Imported shipment	ton 31.75	33.00	31.75	33.00	31.75	33.00
Fused, imp., 900 lb bbls NY	ton	31.00	....	31.00	.....	31.00
Fluosilicate, crys, 400 lb bbls wks	lb. .10	10½	.10	.10½	.10	.10½
Oxide, USP, light, 100 lb bbls	lb.	.42	....	.42	.....	.42
Heavy, 250 lb bbls	lb.	.50	....	.50	.....	.50
Peroxide, 100 lb cs	lb. 1.00	1.25	1.00	1.25	1.00	1.25
Silicofluoride, bbls	lb. .09½	.10½	.09½	.10½	.09½	.10½
Stearate, bbls	lb. .16½	.17	.16½	.17	.16½	.26
Manganese Borate, 30%, 200 lb bbls	lb. .15	.16	.15	.16	.15	.19
Chloride, 600 lb casks	lb. .07	.08	.07	.08	.07	.08½
Dioxide, tech (peroxide) drs	lb. .03½	.06	.03½	.06	.03½	.06
Sulfate, 550 lb drs NY	lb. .07	.08	.07	.08	.07	.08
Mangrove 55%, 400 lb bbls	lb.	.04	....	.04	.....	.04
Bark, African	ton	22.00	....	22.00	21.00	25.00
Marble Flour, bulk	ton 12.00	13.00	12.00	13.00	12.00	15.00
Mercurous chloride	lb. .67	.72	.67	.72	.67	.93
Mercury metal	76 lb flask	49.00	....	49.00	47.00	74.50
Meta-nitro-aniline	lb. .67	.69	.67	.69	.67	.69
Meta-nitro-para-toluidine 200 lb. bbls	lb. 1.40	1.55	1.40	1.55	1.40	1.55
Meta-phenylene-diamine 300 lb. bbls	lb. .80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb. bbls	lb. .67	.69	.67	.69	.67	.69
Methanol, (Wood Alcohol)						
95% tanks	gal. .33	.35	.33	.35	.33	.35
97% tanks	gal. .34	.39	.34	.39	.34	.39
*Pure, Synthetic drums cars	gal.	.37½	....	.37½	.37½	.41½
*Synthetic tanks	gal.	.35½	....	.35½	.....	.35½
Methyl Acetate, drums 82%	gal. .12	.13	.12	.13	.12	.17½
99%	gal.	.15	....	.15	.....	.15
Acetone, drums	gal. .47	.49	.47	.49	.47	.55
Hexyl Ketone, pure	lb.	1.20	....	1.20	.....	1.20
Anthraquinone	lb. .65	.67	.65	.67	.65	.95
Cellosolve, (See Ethylene Glycol Mono Methyl Ether)	.....	.....	....	....	.....	.....
Chloride, 90 lb cyl	lb. .45	.45	.45	.45	.45	.45
Furoate, tech., 50 gal. dr.	lb.	.50	....	.50	.....	50
Mica, dry grd. bags wks	lb. 65.00	80.00	65.00	80.00	65.00	80.00
Michler's Ketone, kegs	lb.	3.00	....	3.00	.....	3.00
Monochlorobenzene, drums see, Chlorobensene, mono	lb.					
Monomethylparaminosulfate 100 lb drums	lb. 3.75	4.00	3.75	4.00	3.75	4.00
Montan Wax, crude, bags	lb. .03½	.04	.03½	.04	.03½	.07
Myrobalans 25%, liq bbls	lb. .03½	.04½	.03½	.04½	.03½	.04½
50% Solid, 50 lb boxes	lb. .05	.05½	.05	.05½	.05	.05½
J1 bags	ton 34.00	35.00	34.00	35.00	34.00	35.00
J2 bags	ton 15.50	16.50	15.50	16.50	15.25	18.50
R2 bags	ton 15.00	16.00	15.00	16.00	14.75	17.50
Naphtha, v.m.& p. (deodorized) tanks	gal. .08½	.09	.08½	.09	.08½	.10
Naphthalene balls, 250 lb bbls wks	lb.	.05½	....	.05½	.03½	.05½
Crushed, chipped bgs wks	lb.	.04½	....	.04½	.....	.04½
Flakes. 175 lb bbls wks	lb.	.04½	....	.04½	.03½	.04½
Nickel Chloride, bbls	lb. .17	.18	.17	.18	.18	.20
Oxide, 100 lb kegs NY	lb. .35	.37	.35	.37	.35	.40
Salt bbl. 400 bbls lb NY	lb. .11	.13	.11	.13	.10½	.13
Single, 400 lb bbls NY	lb. .11	.12	.11	.12	.10½	.12
Metal ingot	lb. .35	.35	.35	.35	.35	.35
Nicotine, free 40%, 8 lb tins, cases	lb. 1.25	1.30	1.25	1.30	1.25	1.30
Sulfate, 55 lb. drums	lb. .74½	.86	.74½	.86	.74½	.....
Nitre Cake, bulk	ton 10.00	12.00	10.00	12.00	10.00	12.00
Nitrobenzene, redistilled, 1000 lb drs wks	lb. .09	.09½	.09	.09½	.09	.09½
Nitrocellulose, c-l-l-cl, wks	lb. .29½	.33	.29½	.33	.25	.36
Nitrogenous Material, bulk unit	1.50	1.60	1.50	1.60	1.35	1.55
Nitronaphthalene, 550 lb bbls	lb.	.25	....	.25	.....	25
Nitrotoluene, 1000 lb drs wks	lb. .14	.15	.14	.15	.14	.15
Nutgalls Aleppy, bags	lb.	.18	....	.18	.....	.18
Chinese, bags	lb. .17	.18	.17	.18	.17	.18
Oak Bark, ground	ton 30.00	35.00	30.00	35.00	30.00	35.00
Whole	ton 20.00	23.00	20.00	23.00	20.00	23.00
Orange-Mineral, 1100 lb casks NY	lb. .10½	.10½	.10½	.10½	.09½	.10½

*delivered basis (east of Miss. River)

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Orthoaminophenol, 50 lb kgs	lb. 2.15	2.25	2.15	2.25	2.1	2.25
Orthoanisidine, 100 lb drs	lb. 1.00	1.15	1.00	1.15	1.15	1.50¾
Orthochlorophenol, drums	lb. .50	.65	.50	.65	.50	.65
Orthocresol, drums	lb. .13	.15	.13	.15	.13	.22
Orthodichlorobenzene, 1000 lb. drums	lb. .07	.10	.07	.10	.07	.10
Orthonitrochlorobenzene, 1200 lb drs wks	lb. .28	.29	.28	.29	.28	.29
Orthonitrotoluene, 1000 lb drs wk	lb. .14	.16	.14	.16	.14	.18
Orthonitrophenol, 350 lb dr	lb. .85	.90	.85	.90	.85	.90
Orthotoluidine, 350 lb bbl le-1	lb. .20	.22	.20	.22	.20	.22
Orthonitroparachlorphenol, tins	lb. .70	.75	.70	.75	.70	.75
Osage Orange, crystals	lb. .16	.17	.16	.17	.16	.17
51 deg. liquid	lb. .06	.06½	.06	.06½	.06	.07½
Powdered. 100 lb bags	lb. .14½	.15	.14½	.15	.14½	.15
Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.	lo. .02¾	.02¾	.02¾	.02¾	.02¾	.03
128-132 deg. M. P.	lb. .03½	.03½	.03½	.03¾	.....	.03½
133-137 deg. M. P.	lb. .043	.04½	.043	.04½	.04	.04¼
Para Aldehyde, 110-55 gal drs	lb. .20½	.23	.20½	.23	.20½	.23
Aminoacetanilid, 100 lb bg	lb. .52	.60	.52	.60	.52	.60
Aminohydrochloride, 100 lb. kegs	lb. 1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kegs	lb. .78	.80	.78	.80	.78	.80
Chlorophenol, drums	lb. .50	.65	.50	.65	.50	.65
Coumarone, 330 lb drums	lb.	.....	....	....	.....	.....
Cymene, refd, 110 gal dr.	gal. 2.25	2.50	2.25	2.50	2.25	2.50
Dichlorobenzene, 150 lb bbls wks	lb. .15½	.16	.15½	.16	.15½	.16
Nitroacetanilid, 300 lb bbls	lb. .45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls wks	lb. .48	.55	.48	.55	.48	.55
Nitrochlorobenzene, 1200 lb drs wks	lb. .23	.26	.23	.26	.23	.26
Nitro-orthotoluidine, 300 lb. bbls	lb. 2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol 185 lb bbls	lb. .45	.50	.45	.50	.45	.50
Nitrosodimethylaniline, 120 lb. bbls	lb. .92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls	lb. .29	.31	.29	.31	.29	.31
Phenylenediamine, 350 lb bbls	lb. 1.15	1.20	1.15	1.20	1.15	1.20
Toluenesulfonamide, 175 lb bbls	lb. .70	.75	.70	.75	.70	.75
Toluenesulfonchloride, 410 lb bbls wks	lb. .20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls wk	lb.	.58	....	.58	.42	.43
Paris Green, Arsenic Basis 100 lb kegs	lb.	.24	....	.24	.24	.27
250 lb kegs	lb.	.23	....	.23	.23	.25
Persian Berry Ext., bbls	lb. .25	Nom	.25	Nom	.25	Nom.
Pentasol (see Alcohol, Amyl)						
Pentasol Acetate (see Amyl Acetate)						
Petrolatum, Green, 300 lb bbl.	lb. .01½	.02	.01½	.02	.02	.02½
Petroleum solvents and diluents Cleaners' naphtha, Group 3, tanks	gal. .05¾	.06¾	.05¾	.06¾	.....	.....
Lacquer diluents, Bayonne tanks	gal. .12	.12¼	.12	.12¼	.....	.....
Group 3, tanks	gal. .07	.08	.07	.08	.....	.....
Petroleum thinner 47-49 deg. tanks	gal.	.08½	....	.08½	.....	.....
Rubber solvent, stand. grade tanks	gal. .05¾	.06	.05¾	.06	.....	.....
Stoddard solvents 48-50 deg. tanks	gal. .05¾	.05¾	.05¾	.05¾	.....	.....
Phenol, 250-100 lb drums	lb. .14¼	.15	.14¼	.15	.14¼	.15
Phenyl-Alpha-Naphthylamine, 100 lb kegs	lb.	1.35	....	1.35	.....	1.35
Phenylhydrazine Hydrochloride	lb. 2.90	3.00	2.90	3.00	2.90	3.00

Phosphate

Phosphate Acid (see Superphosphate)						
Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis	ton 3.10	3.25	3.10	3.25	3.10	3.25
70% basis	ton 3.75	3.90	3.75	3.90	3.75	3.90
72% basis	ton 4.25	4.35	4.25	4.35	4.25	4.35
75-74% basis	ton 5.25	5.50	5.25	5.50	5.25	5.50
75% basis	ton	5.75	....	5.75	.....	5.75
77-80% basis	ton	6.25	....	6.25	.....	6.25
Tennessee, 72% basis	ton	5.00	....	5.00	.....	5.00
Phosphorous Oxychloride 175 lb cyl	lb. .18	.20	.18	.20	.18	.20
Red, 110 lb cases	lb. .40	.45	.40	.45	.40	.46
Yellow, 110 lb cases wks	lb. .27½	.32	.27½	.32	.27½	.37½
Sesquisulfide, 100 lb cs	lb. .38	.44	.38	.44	.38	.44
Trichloride, cylinders	lb. .18	.20	.18	.20	.18	.20
Phthalic Anhydride, 100 lb bbls wks	lb. .15	.16	.15	.16	.15	.16
Pigments Metallic, Red or brown bags, bbls, Pa. wks	ton 37.00	45.00	37.00	45.00	37.00	45.00
Pine Oil, 55 gal drums or bbls Destructive dist	lb. .59	.62	.59	.62	.59	.63
Prime bbls	bbl. 8.00	10.60	8.00	10.60	8.00	10.60
Steam dist. bbls	gal. .59	.61	.59	.61	.54	.61
Pitch Hardwood wks	ton	25.80	....	25.80	20.00	35.00
Plaster Paris, tech, 250 lb bbls	bbl. 3.30	3.50	3.30	3.50	3.30	3.50
Platinum, Refined	oz. 32.00	37.00	32.00	37.00	32.00	38.00
Pontol, tanks	per gal.	.54	....	.54	.54	.54

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	Current Market	1933 Low	1933 High	1932 Low	1932 High
Potash, Caustic, wks, solid...lb.	.06½	.06½	.06½	.06½	.06¾
flake.....lb.	.0705	.08	.0705	.08	.0705	.08
Potash Salts, Rough Kainit 12.4% basis bulk.....ton	.....	9.20	....	9.20	.....	9.20
14% basis.....ton	.....	9.70	....	9.70	.....	9.70
Manure Salts.....						
20% basis bulk.....ton	.....	12.00	....	12.00	12.00	12.65
30% basis bulk.....ton	.....	19.15	....	19.15	.....	19.15
Potassium Acetate.....lb.	.27	.28	.27	.28	.27	.28
Potassium Muriate, 80% basis bags.....ton	.....	37.15	....	37.15	.....	37.15
Pot. & Mag. Sulfate, 48% basis bags.....ton	.....	27.80	....	27.80	.....	27.80
Potassium Sulfate, 90% basis bags.....ton	....	47.50	....	47.50	47.50	48.25
Potassium Bicarbonate, USP, 320 lb bbls.....lb.	.07½	.09	.07½	.09	.07½	.09
Bichromate Crystals, 725 lb casks.....lb.	.07½	.08	.07½	.08	.07	.08½
Binoxalate, 300 lb bbls.....lb.	.14	.17	.14	.17	.14	.17
Bisulfate, 100 lb kegs.....lb.	.16	.30	.16	.30	.16	.30
Carbonate, 80-85% calc. 800 lb casks.....lb.	.04⅞	.05	.04⅞	.05	.0475	.05
Chlorate crystals, powder 112 lb keg wks.....lb.	.08	.08½	.08	.08½	.08	.08½
Chloride, crys bbls.....lb.	.04	.04¼	.04	.04¼	.04	.04¼
Chromate, kegs.....lb.	.23	.28	.23	.28	.23	.28
Cyanide, 110 lb. cases.....lb.	.50	.57½	.50	.57½	.50	.57½
Metabisulfite, 300 lb. bbl...lb.	.10½	.11	.10½	.11	.10½	.13
Oxalate, bbls.....lb.	.16	.24	.16	.24	.16	.24
Perchlorate, casks wks.....lb.	.09	.11	.09	.11	.09	.11
Permanganate, USP, crys 500 & 100 lb drs wks.....lb.	.16	.16½	.16	.16½	.16	.16½
Prussiate, red, 112 lb keg...lb.	.37½	.38½	.37½	.38½	.....	.38½
Yellow, 500 lb casks.....lb.	.16½	.17	.16½	.17	.16½	.21
Tartrate Neut, 100 lb keg...lb.	.....	.21	....	.21	.....	.21
Titanium Oxalate, 200 lb bbls .....lb.	.21	.23	.21	.23	.21	.23
Propane, group 3, tanks.....		.07	....	.07	.....	.....
Propyl Furoate, 1 lb tins.....lb.	.....	5.00	....	5.00	.....	5.00
Pumice Stone, lump bags.....lb.	.04	.05	.04	.05	.04	.05
250 lb bbls.....lb.	.04½	.06	.04½	.06	.04½	.06
Powdered, 350 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.03
Putty, commercial, tubs..100 lb.	2.00	2.25	2.00	2.25	2.00	2.45
Linseed Oil, kegs.....100 lb.	3.40	3.50	3.40	3.50	3.40	4.75
Pyridine, 50 gal drums .....gal.	.85	.95	.85	.95	.85	1.2!
Pyrites, Spanish cif Atlantic ports bulk.....unit	.12	.13	.12	.13	.12	.13
Quebracho, 35% liquid tks...lb.	.02	.02½	.02	.02½	.02	.03
450 lb bbls c-1.....lb.	.02½	.02½	.02½	.02½	.02½	.03½
35% Bleaching, 450 lb bbl..lb.	.02	.02½	.02	.02½	.02	.04
Solid, 63%, 100 lb bales cif..lb.	.02⅜	.02½	.02⅜	.02½	.02	.02½
Clarified, 64%, bales... lb.	.02⅜	.03	.02⅜	.03	.02½	.03½
Quercitron, 51 deg liquid 450 lb bbls.....lb.	.05½	.06	.05½	.06	.05½	.06
Solid, 100 lb boxes.....lb.	.09½	.13	.09½	.13	.09½	.13
Bark, Rough.....ton	.....	14.00	....	14.00	.....	14.00
Ground.....ton	34.00	35.00	34.00	35.00	34.00	35.00
R Salt, 250 lb bbls wks.....lb.	.40	.44	.40	.44	.40	.44
Red Sanders Wood, grd bbls. lb.	.....	.18	....	.18	.....	.18
Resorcinol Tech, cans.....lb.	.65	.70	.65	.70	.65	.70
Rosin Oil, 50 gal bbls, first run .....gal.	.42	.43	.42	.43	.41	.45
Second run.....gal.	.46	.47	.46	.47	.45	.51

Rosin

Rosins 600 lb bbls 280 lb.....unit ex. yard N. Y.						
B.....	....	2.90	....	2.90	2.95	3.65
D.....	....	3.10	....	3.10	3.15	3.75
E.....	....	3.60	....	3.60	3.37½	4.00
F.....	....	4.02½	....	4.02½	3.40	4.15
G.....	....	4.02½	....	4.02½	3.45	4.15
H.....	....	4.10	....	4.16	3.45	4.20
I.....	....	4.15	....	4.75	3.47½	4.25
K.....	....	4.30	....	4.30	3.60	4.65
M.....	....	4.85	....	4.85	4.20	5.25
N.....	....	5.10	....	5.10	4.65	6.05
WG.....	....	5.60	....	5.60	5.25	6.45
WW.....	.....	6.20	.....	6.20	5.85	6.65
Rotten Stone, bags mines....ton	23.50	24.00	23.50	24.00	20.00	23.00
Lump, imported, bbls.....lb.	.05	.07	.05	.07	.05	.07
Selected bbls.....lb.	.09	.12	.09	.12	.09	.2
Powdered, bbls.....lb.	.02	.05	.02	.05	.02	.05
Sago Flour, 150 lb bags.....lb.	.02½	.03	.02½	.03	.02½	.04
Sal Soda, bbls wks.....100 lb.	.90	1.00	.90	1.00	.90	1.00
Salt Cake, 94-96% c-1 wks...ton	13.00	14.00	13.00	14.00	13.00	15.50
Chrome.....ton	12.00	13.00	12.00	13.00	12.00	14.50
Saltpetre, double refd granular 450-500 lb bbls.....lb.	.06	.06¾	.06	.06¾	.06	.06¾
Satin, White, 500 lb bbls.....lb.	.....	.01½	....	.01½	.....	.01½
Shellac Bone dry bbls.....lb.	.18	.19	.18	.19	.16	.26
Garnet, bags.....lb.	.15	.16	.15	.16	.15	.20
Superfine, bags.....lb.	.09½	.10½	.09½	.10½	.10	.14
T. N. bags.....lb.	.08½	.09½	.08½	.09½	.09	.13
Schaeffer's Salt kegs.....lb.	.48	.50	.48	.50	.48	.50
Silica, Crude, bulk mines....ton	8.00	11.00	8.00	11.00	8.00	11.00
Refined, floated bags.....ton	22.00	30.00	22.00	30.00	22.00	30.00
Air floated bags.....ton	.....	32.00	....	32.00	.....	32.00
Extra floated bags.....ton	30.00	35.00	30.00	35.00	30.00	40.00
Soapstone, Powdered, bags f.o.b. mines.....ton	15.00	22.00	15.00	22.00	15.00	22.00

Soda

Soda Ash, 58% dense, bags c-1 wks.....100 lb.	.....	1.17½	....	1.17½	1.17½	.....
58% light, bags.....100 lb.	.....	1.20	....	1.20	1.15	1.20
Contract, bags c-1 wks..100 lb.	.....	1.20	....	1.20	1.15	1.20
Soda Caustic, 76% grnd & flake drums.....100 lb.	2.95	3.00	2.95	3.00	2.90	3.00
76% solid drs.....100 lb.	.....	2.55	....	2.55	2.50	2.55
Sodium Abietate, drs.....lb.	.....	.03	....	.03	.....	.03
Acetate, tech 450 lb. bbls wks lb.	.04¼	.05	.04¼	.05	.04½	.05
Alignate, drs.....lb.	.....	.50	....	.50	.....	.50
Arsenate, drums.....lb.	.07¾	.08¾	.07¾	.08¾	.....	.....
Arsenite, drums.....gal.	.50	.75	.05	.75	.50	.75
Bicarb, 400 lb bbl.....100 lb.	.....	2.25	....	2.25	.....	2.25
Bichromate, 500 lb cks wks lb.	.044	.04¾	.044	.04¾	.044	.05¾
Bisulfite, 500 lb bbl wks....lb.	.02½	.03	.02½	.03	.03	.04
Chlorate, wks.....lb.	.05½	.07¾	.05½	.07¾	.05½	.07¾
Chloride, technical.....ton	12.00	13.00	12.00	13.00	12.00	13.00
Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.15½	.16	.15½	.16	.15½	.17
Fluoride, 300 lb bbls wks....lb.	.07	.07½	.07	.07½	.07	.07½
Hydrosulfite, 200 lb bbls f.o.b. wks.....lb.	.20	.21	.20	.21	.21	.24
Hypochloride solution, 100 lb. cbys.....lb.	.....	.05	....	.05	.....	.05
Hyposulfite, tech, pea cyrs 375 lb bbls wks.....100 lb.	2.40	3.00	2.40	3.00	2.40	3.00
Technical, regular crystals 375 lb bbls wks....100 lb.	2.40	2.65	2.40	2.65	2.40	2.65
Metanilate, 150 lb bbls....lb.	.44	.45	.44	.45	.44	.45
Metasilicate, c-1, wks..100 lb.	2.85	3.25	2.85	3.25	2.85	4.00
Monohydrate, bbls.....lb.	.....	.02½	....	.02½	.....	.02½
Naphthionate, 300 lb bbl...lb.	.52	.54	.52	.54	.52	.54
Nitrate, 92%, crude, 200 lb. bags c-1 NY .....100 lb.	.....	1.26	....	1.26	1.185	1.73½
Nitrite, 500 lb bbls spot....lb.	.07¼	.08	.07¼	.08	.07¼	.08
Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb.	.25	.27	.25	.27	.25	.27
Perborate, 275 lb bbls.....lb.	.17	.19	.17	.19	.17	.20
Phosphate, di-sodium, tech. 310 lb bbls.....100 lb.	2.00	2.10	2.00	2.10	2.00	2.75
tri-sodium, tech, 325 lb bbls.....100 lb.	2.15	2.50	2.15	2.50	2.15	3.20
Picramate, 160 lb kegs ....lb.	.69	.72	.69	.72	.69	.72
Prussiate, Yellow, 350 lb bb wks.....lb.	.11½	.12	.11½	.12	.11½	.12
Pyrophosphate, 100 lb keg..lb.	.15	.20	.15	.20	.15	.20
Silicate, 60 deg 55 gal drs, wks .....100 lb.	1.65	1.70	1.65	1.70	1.65	1.70
40 deg 55 gal drs, wks .....100 lb.	.....	.75	....	.75	.....	.75
Silicofluoride, 450 lb bbls NY .....lb.	.04½	.05½	.04½	.05½	.05½	.06½
Stannate, 100 lb drums.....lb.	.....	.18	....	.18	.17	.19
Stearate, bbls.....lb.	.20	.25	.20	.25	.20	.25
Sulfanilate, 400 lb bbls.....lb.	.16	.18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bbls c-1 wks.....lb.	.02	.02½	.02	.02½	.02	.02½
Sulfide, 80% crystals, 440 lb bbls wks.....lb.	.02½	.02½	.02½	.02½	.02½	.02½
62% solid, 650 lb drums 1c-1 wks.....lb.	.03	.03½	.03	.03½	.03	.03½
Sulfite, crystals, 400 lb bbls wks.....lb.	.03	.03½	.03	.03½	.03	.03½
Sulfocyanide, bbls .....lb.	.28	.35	.28	.35	.28	.35
Tungstate, tech, crystals, kegs .....lb.	.57	.67	.57	.67	.60	.88
Spermaceti, blocks, cases.....lb.	.18	.19	.18	.19	.....	.....
Cakes, cases.....lb.	.19	.20	.19	.20	.....	.....
Spruce Extract, ord., tanks..lb.	.....	.00⅞	....	.00⅞	.00⅞	.01
Ordinary, bbls.....lb.	.....	.01¼	....	.01¼	.01¼	.01⅜
Super spruce ext., tanks....lb.	.....	.01¼	....	.01¼	.01¼	.01⅜
Super spruce ext., bbls....lb.	.....	.01⅜	....	.01⅜	.01⅜	.01¼
Super spruce ext. powd., bags .....lb.	.....	.04	....	.04	.04	.04¼
Starch, powd, 140 lb bags .....100 lb.	.....	2.29	....	2.29	2.29	2.67
Pearl, 140 lb bags.....100 lb.	.....	2.19	....	2.19	2.19	2.84
Potato, 200 lb bags.....lb.	.03¾	.04	.03¾	.04	.03¾	.06
Imported bags.....lb.	.04¼	.05	.04¼	.05	.04	.06¼
Soluble.....lb.	.08	.08½	.08	.08½	.08	.08½
Rice, 200 lb bbls.....lb.	.07½	.08½	.07½	.08½	.07½	.10
Wheat, thick bags.....lb.	.06	.06½	.06	.06½	.06	.07
Thin bags.....lb.	.09½	.10	.09½	.10	.09½	.10
Strontium carbonate, 600 lb bbls wks.....lb.	.07½	.07½	.07½	.07½	.07½	.07½
Nitrate, 600 lb bbls NY....lb.	.07	.07½	.07	.07½	.07	.07¼
Peroxide, 100 lb drs.....lb.	.....	1.25	....	1.25	.....	1.25
Sulfur Brimstone, broken rock, 250 lb bag c-1.....100 lb.	.....	2.05	....	2.05	.....	2.05
Crude, f. o. b. mines.....ton	18.00	19.00	18.00	19.00	18.00	19.00
Flour for dusting 99½%, 100 lb bags c-1 NY....100 lb.	.....	2.40	....	2.40	.....	2.40
Heavy bags c-1.....100 lb.	.....	2.50	....	2.50	.....	2.50
Flowers, 100%, 155 lb bbls c-1 NY.....100 lb.	.....	3.45	....	3.45	.....	3.45
Roll, bbls 1c-1 NY....100 lb.	2.65	2.85	2.65	2.85	2.65	2.85
Sulfur Chloride, red, 700 lb drs wks.....lb.	.05	.05½	.05	.05½	.05	.05½
Yellow, 700 lb drs wks.....lb.	.03½	.04½	.03½	.04½	.03½	.04½
Sulfur Dioxide, 150 lb cyl....lb.	.07	.07½	.07	.07½	.07	.07½
Extra, dry, 100 lb cyl.....lb	.10	.12	.10	.12	.10	.12
Sulfuryl Chloride.....lb.	.15	.40	.15	.40	.15	.40

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	Current Market	1933 Low	1933 High	1932 Low	1932 High
Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	12.00	15.00	12.00	15.00
Refined, 100 lb bgs NY..ton	16.00	18.00	16.00	18.00	16.00	18.00
French, 220 lb bags NY....ton	18.00	22.00	18.00	22.00	18.00	22.00
Refined, white, bags....ton	35.00	40.00	35.00	40.00	35.00	40.00
Italian, 220 lb bags NY...ton	48.50	50.00	48.50	50.00	40.00	50.00
Refined, white bags.....ton	50.00	55.00	50.00	55.00	50.00	55.00
Superphosphate, 16% bulk, wks.....ton	6.50	7.00	6.50	7.00	7.00	8.00
Run of pile.....ton	6.00	6.50	6.00	6.50	.....	.....
Tankage Ground NY.....unit	1.70	1.75*	1.70	1.75*	1.30	1.50
High grade f.o.b. Chicago.unit	.....	1.00	....	1.00	1.00	1.80
South American cif.....unit	.....	1.80	....	1.80	1.80	2.25
Tapioca Flour, high grade bgs..lb	.03½	.05	.03½	.05	.03½	.05
Medium grade, bags.....lb.	.03	.04	.03	.04	.03	.04
Tar Acid Oil, 15%, drums...gal.	.21	.22	.21	.22	.21	.22
25% drums.....gal.	.23	.24	.23	.24	.23	.24
Terra Alba Amer. No. 1, bgs or bbls mills.....100 lb.	1.15	1.75	1.15	1.75	1.15	1.75
No. 2 bags or bbls...100 lb.	1.00	1.25	1.00	1.25	1.50	2.00
Imported bags.....lb.	.01½	.01½	.01½	.01½	.01½	.01½
Tetrachlorethane, 50 gal dr...lb.	.08½	.09	.08½	.09	.08	.09½
Tetralene, 50 gal drs wks.....lb.	.12	.13	.12	.13	.12	.20
Thiocarbanilid, 170 lb bbl....lb.	.25	.28½	.25	.28½	.25	.28½
Tin.....						
Crystals, 500 lb bbls wks...lb.....		.24	....	.24	.22	.25
Metal Straits NY.....lb.....		.023	....	.23	.211	.24½
Oxide, 300 lb bbls wks.....lb.....		.27½	....	.27½	.23	.26½
Tetrachloride, 100 lb drs wks .....lb.....		.1457	....	.1457	.1420	.1457
Titanium Dioxide 300 lb bbl...lb.	.17½	.19½	.17½	.19½	.17½	.21
Calcium Pigment, bbls.....lb.	.06¼	.06½	.06¼	.06½	.06¼	.07½
Toluene, 110 gal drs.....gal.....		.35	....	.35	.....	.35
8000 gal tank cars wks....gal.....		.30	....	.30	.....	.30
Toluidine, 350 lb bbls.....lb.	.88	.89	.88	.89	.88	.89
Mixed, 900 lb drs wks.....lb.	.27	.28	.27	.28	.27	.32
Toner Lithol, red, bbls.....lb.	.90	.95	.90	.95	.90	.95
Para, red, bbls.....lb.....		.80	....	.80	.....	.80
Toluidine.....lb.	1.50	1.55	1.50	1.55	1.50	1.55
Triacetin, 50 gal drs wks.....lb.	.32	.36	.32	.36	.32	.36
Trichlorethylene, 50 gal dr...lb.	.09½	.10	.09½	.10	.10	.10½
Triethanolamine, 50 gal drs...lb.	.35	.38	.35	.38	.35	.42
Tricresyl Phosphate, drs.....lb.	.21	.26	.21	.26	.21	.26
Triphenyl guanidine.....lb.	.58	.60	.58	.60	.58	.60
Phosphate, drums.....lb.	.37	.39	.37	.39	.50	.65
Tripoli, 500 lb bbls.....100 lb.	.75	2.00	.75	2.00	.75	2.00
Tungsten, Wolframite..per unit.	10.00	11.00	10.00	11.00	10.00	11.75

*&10

	Current Market	1933 Low	1933 High	1932 Low	1932 High
Turpentine carlots, bbls.....gal.....	.45½	....	.45½	.39	.47½
Wood Steam dist, bbls....gal.....	.43	....	.43	.42	.46
Urea, pure, 112 lb cases.....lb.	.15	.17	.15	.17	.15	.17
Fert. grade, bags c.i.f.....ton.....		82.60	....	82.60	.....	82.60
c. i. f. S. points.....ton.....		82.60	....	82.60	.....	82.60
Valonia Beard, 42%, tannin bags.....ton	28.00	29.00	28.00	29.00	28.50	34.00
Cups, 30-31% tannin.....ton.....		19.00	....	19.00	19.00	23.50
Mixture, bark, bags.....ton.....		22.00	....	22.00	22.00	26.00
Vermillion, English, kegs.....lb.	1.28	1.40	1.28	1.40	1.28	1.80
Vinyl Chloride, 16 lb cyl.....lb.....		1.00	....	1.00	.....	1.00
Wattle Bark, bags.....ton	25.00	27.00	25.00	27.00	26.00	33.00
Extract 55%, double bags ex-dock.....lb.	.03	.03½	.03	.03½	.03	.06½
Whiting, 200 lb bags, c-1 wks .....100 lb.	.85	1.00	.85	1.00	.85	1.00
Alba, bags c-1 NY.....ton.....		13.00	....	13.00	.....	13.00
Gilders, bags c-1 NY...100 lb.....		1.35	....	1.35	.....	1.35
Wood Flour, c-l.....bags	20.00	36.00	20.00	36.00	.....	.....
Xylene, 10 deg tanks wks...gal.	.27	.29	.27	.29	.....	.29
Commercial, tanks wks...gal.....		.26	....	.26	.....	.26
Xylidine, crude.....lb.	.36	.37	.36	.37	.36	.37
Zinc Ammonium Chloride powd., 400 lb bbls.....lb.	.04½	.05	.04½	.05	.....	5.75
Carbonate Tech. bbls NY..lb.	.09½	.11	.09½	.11	.09½	.11
Chloride Fused, 600 lb drs wks.....lb.	.05	.05½	.05	.05½	.05	.06
Gran, 500 lb bbls wks.....lb.	.05½	.06	.05½	.06	.05½	.06
Soln 50%, tanks wks...100 lb.....		3.00	....	3.00	2.25	3.00
Cyanide, 100 lb drums.....lb.	.38	.39	.38	.39	.38	.39
Dithiofuroate, 100 lb dr....lb.....		1.00	....	1.00	.....	1.00
Dust, 500 lb bbls c-1 wks...lb.....		.04½	....	.04½	.041	.0525
Metal, high grade slabs c-1 NY.....100 lb.....		3.32	....	3.32	2.87	3.52
Oxide, American bags wk...lb.....		.05½	....	.05½	.0485	.07
French, 300 lb bbls wks...lb.	.08½	.10	.08½	.10	.08½	.11½
Palmitate, bbls.....lb.	.17½	.18½	.17½	.18½	.....	.....
Perborate, 100 lb drs.....lb.....		1.25	....	1.25	.....	1.25
Peroxide, 100 lb drs.....lb.....		1.25	....	1.25	.....	1.25
Resinate, fused, dark, bbls..lb.	.05½	.06½	.05½	.06½	.....	.....
Stearate, 50 lb bbls.....lb.	.16	.17	.16	.17	.16	.22
Sulfate, 400 bbl wks.....lb.	.03	.03½	.03	.03½	.03	.03½
Sulfide, 500 lb bbls.....lb.	.12	.13	.12	.13	.12	.13½
Sulfocarbolate, 100 lb keg..lb.	.21	.22	.21	.22	.21	.24
Zirconium Oxide, Nat. kegs...lb.	.02½	.03	.02½	.03	.02½	.03
Pure kegs.....lb.	.45	.50	.45	.50	.45	.50
Semi-refined kegs.....lb.	.08	.10	.08	.10	.08	.10

Oils and Fats

Castor, No. 1, 400 lb bbls....lb.	.09¼	.10	.09¼	.10	.09½	.10½
No. 3, 400 lb bbls.....lb.	.08¾	.09½	.08¾	.09½	.08¾	.10½
Blown, 400 lb bbls.....lb.....	.....	.....	.....	.....	.11¼	.12½
China Wood, bbls spot NY...lb.	.05½	.05¾	.05½	.05¼	.05¼	.07¾
Tanks, spot NY.....lb.	.04½	.05	.04½	.05	.04½	.06½
Coast, tanks.....lb.	.04¾	.04½	.04¾	.04½	.04½	.06½
Coconut, edible, bbls NY....lb.....		.10¼	....	.10¼	.....	.10¾
Ceylon, 375 lb bbls NY....lb.	.04	.04½	.04	.04½	.04	.04¾
8000 gal tanks NY.....lb.	.03	.03½	.03	.03½	.02¾	.03¾
Cochin, 375 lb bbls NY....lb.	.04½	.04¾	.04½	.04¾	.04½	.06
TanksN Y.....lb.	.04	.04½	.04	.04½	.03½	.05
Manila, bbls NY.....lb.	.04	.04½	.04	.04½	.04	.05
Tanks NY.....lb.	.03½	.03¾	.03½	.03¾	.03½	.04
Tanks, Pacific Coast....lb.	.02¼	.03	.02¼	.03	.02¼	.03½
Cod, Newfoundland, 50 gal bbls .....gal.	.20	.21	.20	.21	.21	.30
Cod Liver see Chemicals.....						
Copra, bags, N. Y.....lb.	.0175	.019	.0175	.019	.0175	.0235
Corn, crude, bbls NY.....lb.....		.05½	....	.05½	.04½	.09
Tanks, mills.....lb.....		.03	....	.03	.02½	.04½
Refined, 375 lb bbls NY...lb.....		.06½	....	.06½	.05½	.07
Tanks.....lb.	.05¾	.06	.05¾	.06	.05	.08¼
Cottonseed, crude, mill.....lb.	.02½	.02¾	.02½	.02¾	.02¼	.04½
Degras, American, 50 gal bbls NY.....lb.	.02½	.03	.02½	.03	.02½	.04
English, brown, bbls NY...lb.	.02¼	.03½	.02¼	.03½	.02¼	.04
Greases, Brown.....lb.	.02	.02½	.02	.02½	.01½	.02½
Yellow.....lb.	.02	.02½	.02	.02½	.01½	.03
White, choice bbls NY.....lb.	.03½	.03¾	.03½	.03¾	.02	.04½
Herring. Coast, Tanks.....gal.	.11	.12	.11	.12	.....	.....
Lard Oil, edible, prime.....lb.	.08½	.08¾	.08½	.08¾	.08½	.10
Extra, bbls.....lb.	.07½	.07¾	.07½	.07¾	.05½	.07¼
Extra No. 1, bbls.....lb.	.06¼	.06¾	.06¼	.06¾	.05½	.07
Linseed, Raw, five bbl lots...lb.....		.08	....	.08	.061	.078
Bbls c-l spot.....lb.....		.072	....	.072	.053	.07
Tanks.....lb.....		.066	....	.066	.047	.064
Menhaden Tanks, Baltimore.gal.	.09½	.10	.09½	.10	.09½	.20
Extra, bleached, bbls NY..gal.	.36	.37	.36	.37	.36	.40
Light, pressed, bbls NY...gal.	.23	.27	.23	.27	.25	.34
Yellow, bleached, bbls NY.gal.	.30	.30½	.30	.30½	.30	.37
Neatsfoot, CT, 20° bbls NY...lb.	.11½	.12	.11½	.12	.11½	.13½
Extra, bbls NY.....lb.	.06¼	.06¾	.06½	.06¾	.05½	.07
Pure, bbls NY.....lb.	.07½	.08	.07¾	.08	.07½	.09
Oleo, No. 1, bbls NY.....lb.....		.06	....	.06	.05½	.07
No. 2, bbls NY.....lb.....		.05½	....	.05½	.04½	.06
No. 3, bbls NY.....lb.....		.06½	....	.06½	.....	.06¾
Olive, denatured, bbls NY...gal.	.49	.60	.49	.60	.51	.65
Edible, bbls NY.....gal.	1.25	1.50	1.25	1.50	1.25	2.00
Foots, bbls NY.....lb.	.04¾	.04¾	.04¾	.04¾	.04½	.05
Palm, Kernel Casks.....lb.....		.04	....	.04	.035	.04¾
Lagos, 1500 lb casks.....lb.	.02¾	.03¼	.02¾	.03¼	.03	.05
Niger, Casks.....lb.	.02¼	.03	.02¼	.03	.03	.03½
Peanut, crude, bbls NY.....lb.	.03¼	.03¼	.03¼	.03¼	.02¾	.04½
Refined, bbls NY.....lb.....		.08¾	....	.08¾	.08½	.09
Perilla, bbls NY.....lb.	.05½	.05½	.05½	.05½	.03¾	.05¼
Tanks, Coast.....lb.	.03¾	.04	.03¾	.04	.03½	.05
Poppyseed, bbls NY.....gal.	1.60	1.70	1.60	1.70	1.60	1.75
Rapeseed, in bond, bbls NY.gal.....		.34	....	.34	.....	.....
denatured, drms, NY.....gal.	.34	.36	.34	.36	.....	.....
Red, Distilled, bbls.....lb.	.05½	.06	.05½	.06	.06½	.07
Tanks.....lb.	.05	.05½	.05	.05½	.05½	.06
Salmon, Coast, 8000 gal tks..gal.	.11	.12	.11	.12	.11	.19
Sardine, Pacific Coast tks...gal.	.09½	.10	.09½	.10	.09½	.17½
Sesame, edible, yellow, dos...lb.....		.09½	....	.09½	.08½	.09½
White, dos.....lb.	.10	.11	.10	.11	.10	.11
Sod, bbls NY.....gal.....		.40	....	.40	.....	.40
Soy Bean, crude.....						
Pacific Coast.....lb.	.032	.035	.032	.035	.02½	.03½
Domestic tanks, f. o. b. mills, ...lb.	.027	.027	.027	.027	.03	.032
Crude, bbls NY.....lb.	.04	.04½	.04	.04½	.03½	.05
Tanks NY.....lb.....		.03½	....	.03½	.03½	.04½
Refined, bbls NY.....lb.	.04½	.05	.04½	.05	.04½	.06
Sperm, 38° CT, bleached, bbls NY.....gal.	.68	.70	.68	.70	.68	.70
45° CT, bleached, bbls NY.gal.	.63	.65	.63	.65	.63	.65
Stearic Acid, double pressed dist bags.....lb.	.07½	.08	.07½	.08	.07½	.09
Double pressed saponified bags .....lb.	.08	.08½	.08	.08½	.07	.08½
Triple, pressed dist bags..lb.	.10½	.10¾	.10½	.10¾	.10½	.11
Stearine, Oleo, bbls.....lb.	.03¾	.04	.03¾	.04	.03¾	.06
Tallow City, extra loose.....lb.	.02¼	.02¼	.02¼	.02¼	.02½	.03¼
Edible, tierces.....lb.....		.03½	....	.03½	.03¾	.04½
Tallow Oil, Bbls, c-1 NY...lb.	.05¼	.06	.05¼	.06	.05¼	.07½
Acidless, tanks NY.....lb.	.06	.06¾	.06	.06¾	.06	.09
Vegetable. Coast mats.....lb.	.06	Nom.	.06	Nom.	.06	Nom.
Turkey Red, single bbls.....lb.	.06½	.07½	.06½	.07½	.06½	.09
Double, bbls.....lb.	.08	.09	.08	.09	.08	.11
Whale, bleached winter, bbls NY.....gal.....		.74	....	.74	.....	.74
Extra, bleached, bbls NY..gal.	.51	.52	.51	.52	.51	.60
Nat. winter, bbls NY.....gal.	.45	.46	.45	.46	.45	.55

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